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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, Ca. 94105-3901

SEP 28 1992

MEMORANDUM

SUBJECT: Record of Decision for the Purity Oil Sales Superfund Site

FROM: Jeff Zelikson, Director
Hazardous Waste Management Division

TO: John Wise, Deputy Regional Administrator

Attached for your signature is a Record of Decision for the Purity Oil Sales Superfund site, Soils Operable Unit.

The selected remedy is identical to the Proposed Plan preferred alternative. The remedy includes:

- Treatment through Soil Vapor Extraction of soils from 14 feet below the surface to the water table;
- Capping the site in accordance with the Resource Conservation and Recovery Act Subtitle C requirements;
- Installing a slurry wall around the perimeter of the site;
- Conducting environmental monitoring to ensure the effectiveness of the remedial action.

If you have any questions, please contact Janet Rosati at 744-2247 or John Blevins at 744-2241.

1918-01466

RECORD OF DECISION

For The

PURITY OIL SALES, INC.

Superfund Site,

Soils Operable Unit

Prepared by
The U.S. Environmental Protection Agency
Region IX
San Francisco, California

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PURITY OIL SALES RECORD OF DECISION

Soils Operable Unit

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Purity Oil Sales Site
Malaga, California

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Purity Oil Sales site, which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) and, to the extent practicable, the National Contingency Plan (NCP). This decision is based on the Administrative Record for this site.

The State of California concurs with the selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE REMEDY

This operable unit is the second action of two operable units for the site. The first operable unit involved remediation of the groundwater. This second operable unit addresses contaminated soil which is the source of the groundwater contamination. This action addresses the principal threats at the site through a combination of treatment and containment and is considered the final action to be taken by EPA at the site.

The major components of the selected remedy include:

- Treatment through Soil Vapor Extraction of soils from 14 feet below the surface to the water table;
- Capping the site in accordance with the Resource Conservation and Recovery Act Subtitle C requirements;
- Installing a slurry wall around the perimeter of the site;
- Conducting environmental monitoring to ensure the effectiveness of the remedial action.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

Because this remedy will result in hazardous substances remaining on-site above health-based levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

John Wise for

Daniel W. McGovern
Regional Administrator
U.S. Environmental Protection Agency,
Region IX

9.30.92
Date

DECISION SUMMARY

I. Site Name, Location and Description

The 6.8 acre Purity Oil Sales site is located approximately one-half mile south of the Fresno city limits, in the township of Malaga, California (Figure 1). The site is in a zone defined as heavy industrial under the Fresno County General Plan. The site is located in a mixed-use area and is surrounded by agricultural and industrial land on the west, a scrap iron yard on the north, a residential trailer park and market on the northeast, a propane distributor on the east, a small farm on the southeast, and a used auto parts business on the south. The North Central Canal flows along the southern boundary of the site (Figure 2).

About one-half mile to the west and southwest of the site are fields of oats, alfalfa, cotton, fruit trees, and grapes. The town of Malaga, which has a medium density residential area, surrounds the site at distances of about one-half mile and more.

The site is located in a non-attainment area for the following air quality standards: ozone, carbon monoxide (CO) and PM-10.

The Purity site and the surrounding areas do not provide habitat for or sustain any rare or endangered species of plant or animal. There are no signs of any significant wildlife or vegetation on the site itself, other than scrub grasses.

All structures on the site have been removed and the site has been partially regraded.

II. Site History and Enforcement Activities

Waste oil was re-refined at the site from approximately 1934 to 1975. Waste oil was collected from businesses such as service stations, car dealers, truck stops, electrical transformer yards, military facilities, and municipalities. The used oil was re-refined using a number of treatment processes including clarification, chemical addition, dehydration, distillation, and filtration. The oil and by-products from the re-refining process were collected and stored in sumps and storage tanks and were disposed of on-site in unlined sludge pits. A composite diagram of the approximate locations of the buildings, storage areas, and waste disposal areas from 1942 to 1973 is shown in Figure 3.

In 1973, Purity Oil Sales began complying with a Fresno County Superior Court Order to empty and backfill the waste pits. By early 1975, the waste pits had been completely filled with soil and demolition debris. However, no evidence is available to indicate that petroleum wastes stored in the pits were emptied during this period.

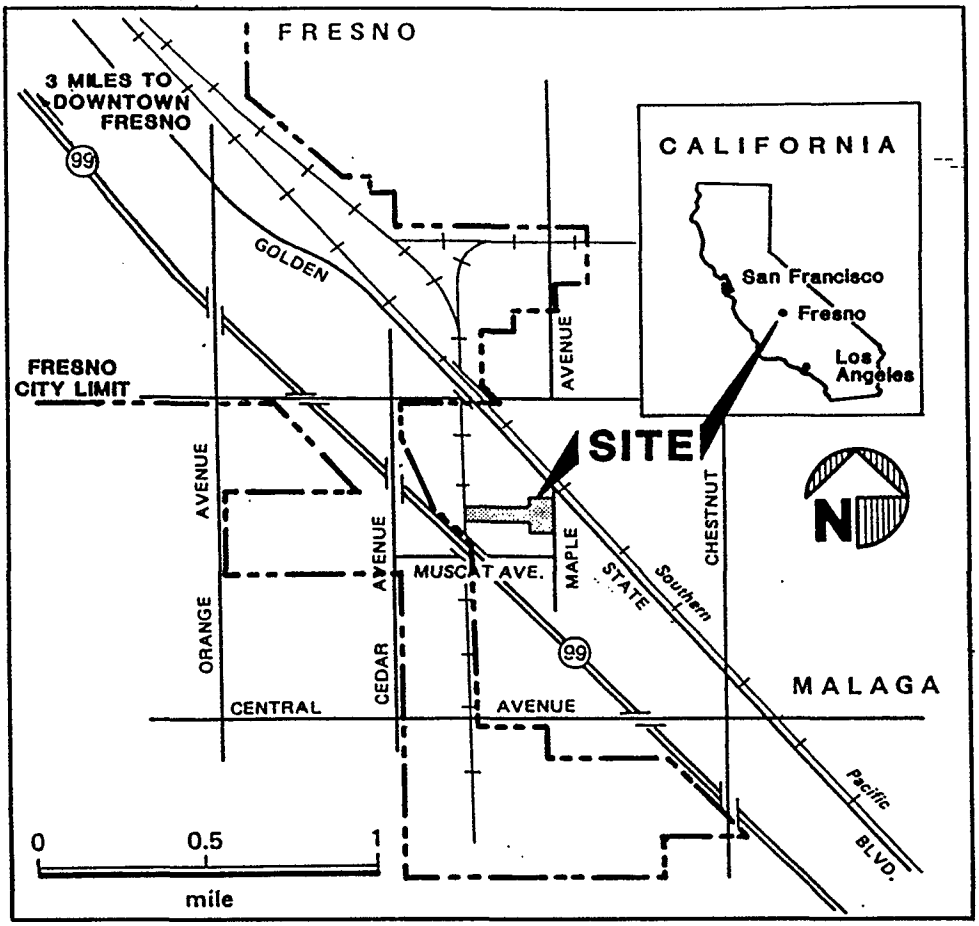


FIGURE 1

SITE LOCATION MAP

REMEDIAL INVESTIGATION REPORT
PURITY OIL SALES SITE
FRESNO, CALIFORNIA

RDD63320.RI

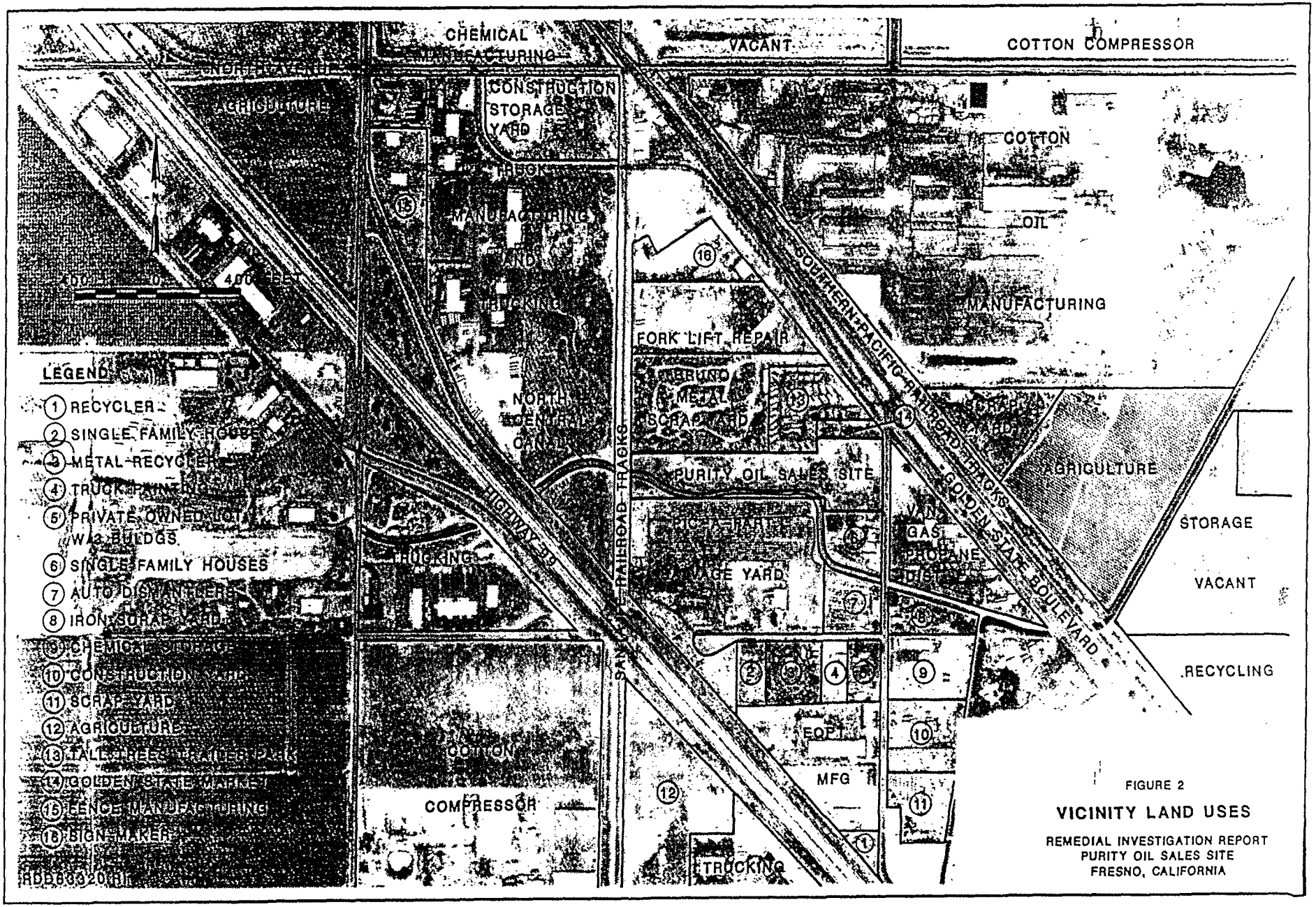
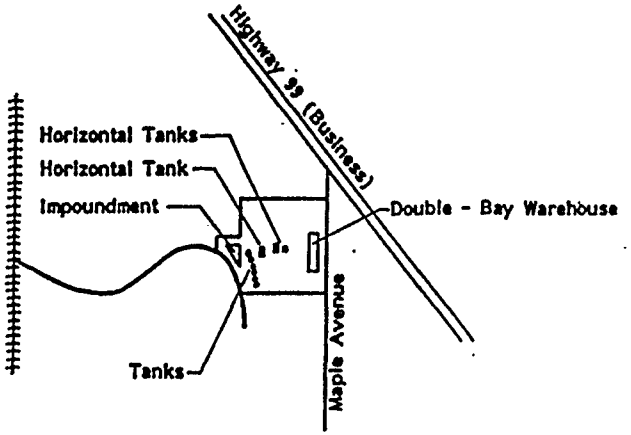


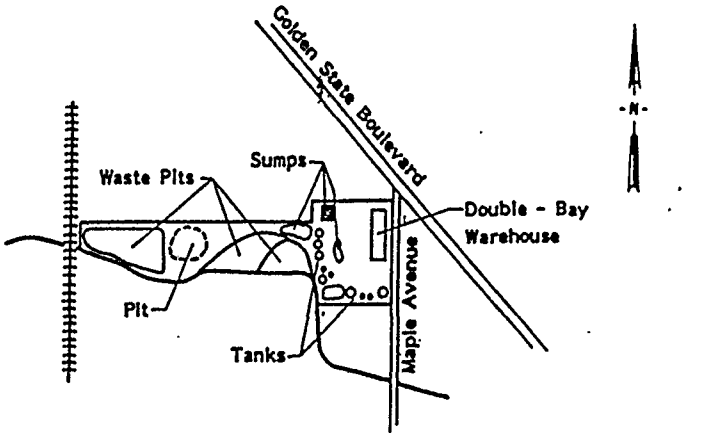
FIGURE 2

VICINITY LAND USES

REMEDIAL INVESTIGATION REPORT
PURITY OIL SALES SITE
FRESNO, CALIFORNIA



a. May 19, 1942
Approximate Scale 1:5200

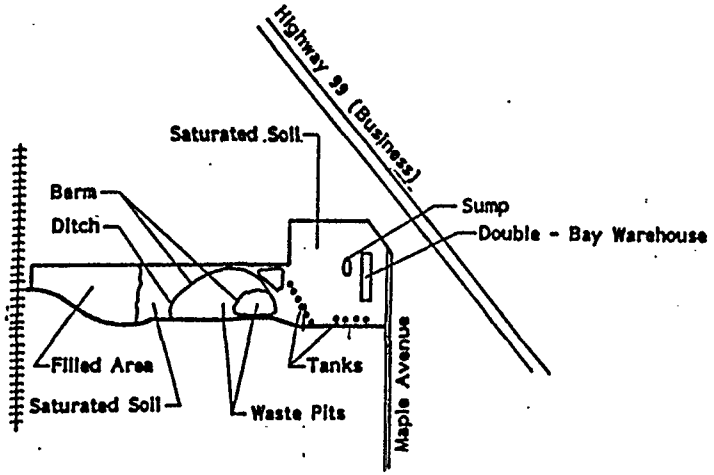


c. 1957 to 1967

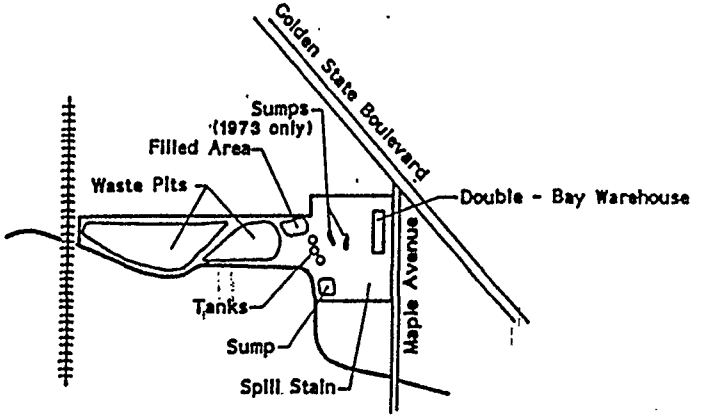
---------Present in 1957 and 1961 Photographs

Present in 1957 Photograph Only

Approximate Scale 1:6000



b. January 31, 1950
Approximate Scale 1:5300



d. 1970 to 1973
Approximate Scale 1:6000

REFERENCE: BACKGROUND REPORT, DOHS 1985

FIGURE 3

SITE LAYOUT 1942 - 1973

REMEDIAL INVESTIGATION REPORT
PURITY OIL SALES SITE
FRESNO, CALIFORNIA

ROD83320.RI

During its history, the re-refining facility changed ownership several times. The original owners were William Dickey and Ray Turner, who operated the facility from 1934 to 1948. In 1948, William Siegfried and Robert Hall purchased the site as Paraco Oil, Inc. The site and facilities were sold to Michael Marcus of Purity Oil Sales, Inc., in 1965. In 1975, Michael Marcus filed for bankruptcy, and the site was held by the State of California for non-payment of taxes. The site was sold to an individual in 1979, who was granted a recision of the sale in 1982. The site was returned to the custody of the State of California where it remains today. Title of the property was returned to Purity Oil Sales, Inc. in 1984.

In February 1982, the EPA Emergency Response Team, the California Department of Toxic Substances Control (DTSC) and the California Regional Water Quality Control Board carried out a joint site investigation that included soil and groundwater sampling and air emissions monitoring. The site was placed on the National Priorities List in December 1982.

The Department of Toxic Substances Control was designated lead agency for the site and published a Remedial Investigation Report on May 12, 1986. During the state's remedial investigation, EPA's Emergency Response Team removed about 1,800 cubic yards of hazardous material from the site.

In January 1986, EPA assumed the lead for the site and expanded the remedial investigation work performed by the state to include additional soil and groundwater studies.

During September 1987, EPA's Emergency Response Team removed approximately 33,000 gallons of oil and water from one of seven above ground tanks to eliminate the potential for an oil spill.

EPA issued a Remedial Investigation Report in October 1988. A Feasibility Study and a Proposed Plan for Soil and Groundwater were issued in April 1989. The Regional Administrator signed a Record of Decision (ROD) for the Groundwater and Tanks Operable Unit on September 26, 1989.

EPA conducted two remedial actions in accordance with the ROD. In October 1991, seven large above-ground steel tanks and their contents were removed from the site. In March 1992, private well users downgradient of the site were connected to either the Malaga County Water District or the City of Fresno water system.

In May 1992, EPA issued a Soil Solidification Feasibility and Cost Evaluation Report and a Revised Soil Vapor Extraction and Cap Feasibility Study. A Revised Proposed Plan for Soil was issued in June 1992.

General Notice letters for the groundwater operable unit were issued to 108 Potentially Responsible Parties (PRPs) on April 19, 1990. EPA issued Special Notice letters for the groundwater

operable unit to 87 PRPs on April 1, 1991. After EPA and the PRPs failed to negotiate a settlement, EPA issued a Unilateral Administrative Order on September 30, 1991 to the California Department of Transportation, Chevron Corporation, Cummins West, Foster Poultry Farms, Morrison-Knudsen Engineers, Pacific Gas & Electric Company, Phillips Petroleum, Southern Pacific Transportation Company, and Unocal. The Administrative Order required the Respondents to design and construct a groundwater extraction, treatment, and disposal system. EPA issued General Notice letters for the soils operable unit on June 5, 1992 to the existing 87 PRPs and to 59 additional PRPs.

III. Highlights of Community Participation

The Remedial Investigation (RI) Report, the Feasibility Study (FS) Report, the Soil Solidification Feasibility and Cost Evaluation Report, the Revised Soil Vapor Extraction and Cap Feasibility Study, and the Revised Proposed Plan for Soil were released to the public in June 1992. These documents were made available to the public in both the Administrative Record and the information repository maintained at the Superfund Records Center in Region 9 and at the Fresno Central Library. The notice of the availability of these two documents was published in the Fresno Bee on June 8, 1992 and in the Spanish language newspaper Vida En El Valle on June 17, 1992. A public comment period was held from June 8, 1992 through July 10, 1992. A request for an extension to the public comment period was made by the California Department of Toxic Substances Control and the San Joaquin Valley Unified Air Pollution Control District. As a result, the public comment period was extended to August 10, 1992.

A public meeting was held on June 22, 1992. At this meeting, representatives from EPA answered questions about problems at the site and the remedial alternatives under consideration. A response to the comments received during this period is included in the Responsiveness Summary.

This decision document presents the selected remedial action for the Purity Oil Sales site in Malaga, California, chosen in accordance with CERCLA, as amended by SARA, and, to the extent practicable, the National Contingency Plan. The decision for this site is based on the Administrative Record.

IV. Scope and Role of Operable Unit

As with many Superfund sites, the problems at the Purity Oil Sales site are complex. As a result, EPA organized the work into two operable units (OUs). These are:

. OU One: Contamination of the groundwater
. OU Two: Contamination in the soils.

EPA has already selected a groundwater treatment remedy for OU One in a ROD signed September 26, 1989. The OU One action is in the

remedial design stage and is being performed by PRPs under an Administrative Order. This ROD is for OU Two and addresses contaminated soil.

V. Summary of Site Characteristics

Soil contamination extends from the surface to the groundwater table, with the most highly contaminated layers occurring between 0-14 feet, in the location of the former waste pits. A cross section of site soils is shown in Figure 4.

Contaminated surface soils extend vertically to a depth of two feet and are defined as the eastern 2.5 acres of the site where the office and warehouses were located. Waste pits were not located in this area. These surface soils are contaminated with organic compounds, pesticides, oil and grease, and a variety of metals.

The levels of organic compounds in the surface soils are generally below the California Total Threshold Limit Concentration (TTLC) values for definition as a state hazardous waste. The pesticide concentration for 4,4-DDT exceeds the California TTLC value in one location. Four locations had PCB concentrations up to 11 parts per million (ppm), which is well below the TTLC value of 50 ppm. For inorganics, all metals except lead were detected at concentrations below the TTLC. The TTLC value for lead is 1,000 ppm. Lead concentrations range from 18,000 ppm to 27,000 ppm in surface soil. The pH of on-site surface soil samples vary from 0.9 to 8.1.

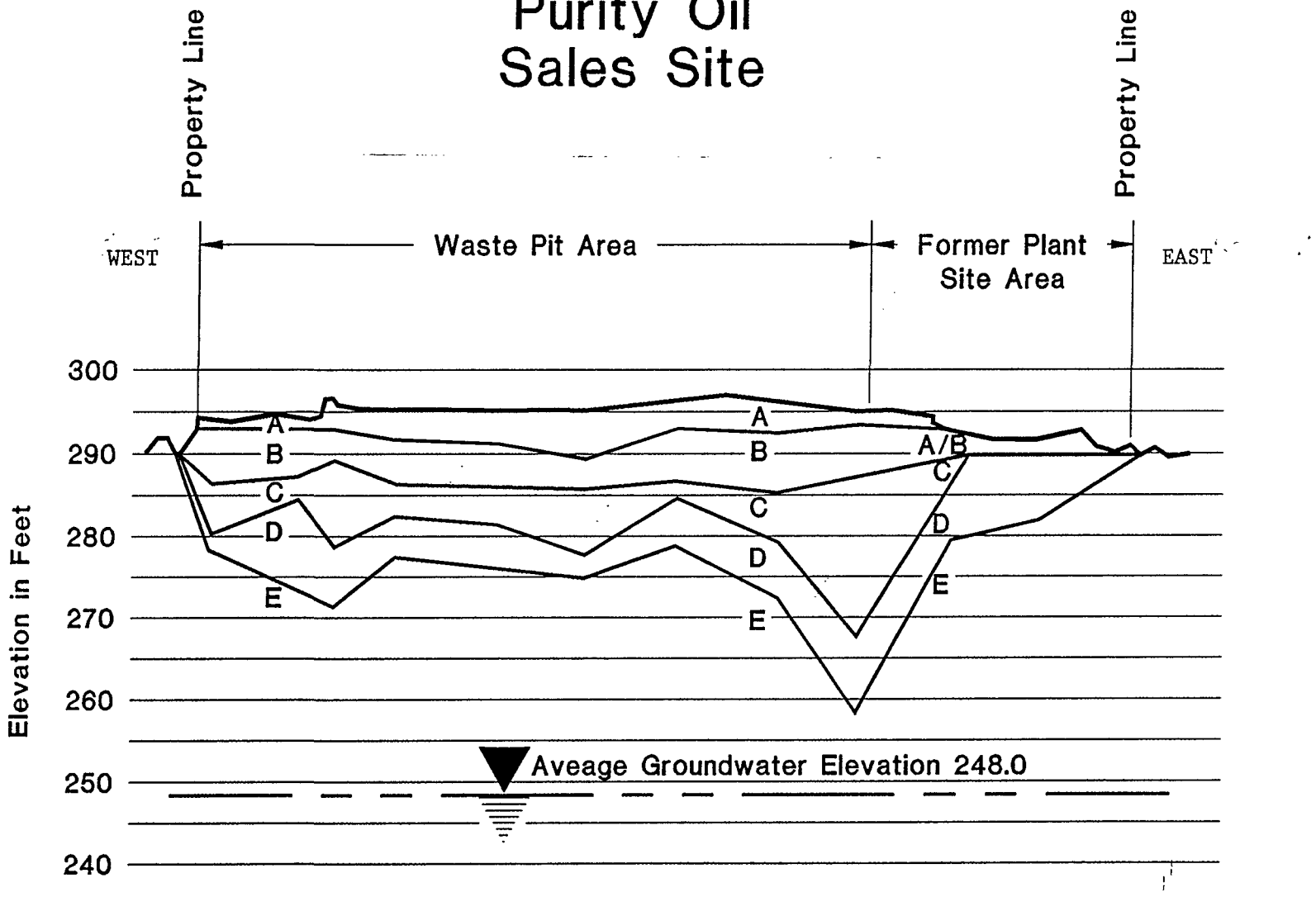
The surface soils have not been determined to be RCRA listed waste or RCRA characteristic waste based on the EP Toxicity test. TCLP has replaced EP Toxicity as the test method used by EPA to determine the leachability of toxic constituents. Toxicity is one characteristic that defines a waste as a Resource Conservation and Recovery Act (RCRA) hazardous waste. A Toxicity Characteristic Leaching Procedure (TCLP) test was not conducted for surface soils.

The waste pit area contains numerous organic compounds, including benzene, toluene, polyaromatic hydocarbons (PAHs), methylene chloride, phthalates, acetone, and numerous solvents. Below the waste pits, the organic compound concentrations decrease rapidly. Concentration levels range from < 10 to 50,000 ppm. Toluene was detected in most waste pit locations onsite, in concentrations ranging from 0.004 to 4,200 ppm. Toluene was also detected in off-site background borings. This off-site contamination is present north, south, and west of the site.

Samples from the waste pit area indicate elevated lead values and low pH values less than or equal to 2. The maximum concentration of lead in the buried waste is 19,600 ppm. The mean concentration of lead in the buried waste is 695 ppm. The state TTLC (1,000 ppm) and Soluble Threshold Limit Concentration (STLC) standard (5 ppm) for lead are exceeded. The state TTLC standard for organic lead (13 ppm) is also exceeded. The waste in layers B and C is RCRA characteristic based on exceedence of the federal TCLP standard of

Site Cross Section

Purity Oil Sales Site



LEGEND

A Soil, construction rubble, waste sludge
B Tar/sludge with soil
C Visually contaminated silty sand (native soil)
D Slightly contaminated silty sand
E Uncontaminated to slightly contaminated silty sand

Figure 4

5.0 ppm for lead. Figures 5-4 through 5-23 in the RI present the chemical investigation results from soil borings.

Lead concentrations in samples taken from locations along the slopes of the North Central Canal above the water surface ranged from 1,200 ppm to 13,000 ppm and exceed the state TTLC standard for lead of 1,000 ppm.

VI. Summary of Site Risks

The baseline risk assessment provides the basis for taking action and indicates the exposure pathways that need to be addressed by the remedial action. It serves as the baseline indicating what risks could exist if no action were taken at the site. This section of the ROD provides the results of the baseline risk assessment conducted for this site.

The particular chemicals of concern identified in the risk assessment are listed in Table 1. The toxicity profiles of the chemicals of concern are included in the Public Health Evaluation (CH2M Hill, 1989).

Acute toxic effects of lead, the primary soil contaminant, include encephalopathy, abdominal pain, hemolysis, liver damage, renal tubular necrosis, seizures, coma and respiratory arrest. Chronic exposure can affect the hematopoietic system, the nervous system, and the cardiovascular system. Lead inhibits several key enzymes involved in heme biosyntheses. One characteristic effect of chronic lead intoxication is anemia, by reduced hemoglobin production and shortened erythrocyte survival. In humans, lead exposure has resulted in nervous system injury including reduced hand-eye coordination, reaction time, visual motor performance, and nerve conduction velocity. Children appear especially sensitive to lead-induced nervous system injury. Lead can also affect the immune system and produce gingival lead lines. Epidemiological studies have indicated that chronic lead exposure may be associated with increased blood pressure in humans. Exposure to lead is associated with sterility, abortion, neonatal mortality, and morbidity. Organolead compounds are neurotoxic.

The exposure pathways of concern that were evaluated for potential health risks are 1) direct contact with contaminated site soils by trespassers and future on-site workers or residents, 2) inhalation of site dusts by current near-site residents or workers, and future on-site residents or workers, and 3) direct contact with contaminated canal sediments by trespassers, farm workers, and irrigation district workers.

The risks for the site were calculated for both on-site residential and occupational exposure. However, since the site is located in an area that is zoned industrial, it is unlikely that there will be future residential uses on-site. Residential exposure was assumed to occur 24 hours a day, 365 days a year for a 70-year period. Occupational exposure was assumed to occur five days per week for

Table 1
CONTAMINANTS OF CONCERN AT THE
PURITY OIL SITE

Acetone
Aldrin
Antimony
Arsenic
Barium
Benzene
Benzoic acid
Beryllium
Beta-BHC
Bis(2-ethylhexyl)phthalate
2-Butanone
Cadmium
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroform
Chromium
Cyanide
4,4-DDD
4,4-DDE
4,4-DDT
Di-n-butyl phthalate
1,1-Dichloroethane
1,1-Dichloroethene
1,2-Dichloroethane
Dieldrin
Diethyl phthalate
Endosulfan
Ethylbenzene
Gamma-BHC (Lindane)
Heptachlor
Heptachlor epoxide
Lead
Methylene chloride
N-nitrosodiphenylamine
Mercury
4-Methyl-2-pentanone
2-Methyl phenol
4-Methyl phenol
Napthalene
N-nitrosodiphenylamine
PAHs[a]
PCBs[b]
Phenol
Selenium
Silver
Styrene
Tetrachloroethene
Toluene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene
Vanadium
Vinyl chloride
Xylenes
Zinc

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[a]PAHs which are considered carcinogenic are assessed as a group (Benzo[a]anthracene, Benzo[k]fluoranthene and Chrysene).

[b]PCBs are assessed as a group (Arochlor 1248, Aroclor 1254, Aroclor 1260).

a 40 year period.

These calculations result in numbers called risk levels, which express the risk in terms of the chance of cancer occurring. A risk level of 1 in 1,000,000 means that one person out of one million people so exposed could develop cancer as a result of the exposure. This risk level is expressed in scientific notation as 1x10-6.

For a Superfund project, EPA's goal is to reduce risk for a site to within or above the range of 1 cancer in 10,000 (1x10-4) to 1 in 1,000,000 (1x10-6) persons.

For non-carcinogens (chemicals that do not cause cancer but may cause other adverse health effects), the risk level is calculated in terms of the Hazard Index (HI). The Hazard Index is a numerical indicator of the transition between acceptable and unacceptable exposure to multiple chemicals. If the HI exceeds 1.0, unacceptable non-carcinogenic health effects may result (e.g., kidney or liver disfunction). When the HI is less than 1.0, insignificant adverse health effects are expected.

Surface Soil and Buried Waste

The data summary for chemicals of concern in surface soil is shown in Table 2. The data summary for chemicals of concern in deep on-site soils is shown in Table 3.

Carcinogenic risk associated with both the surface soil and the buried waste was determined to be within, or below, the acceptable risk range. Risks for surface soil ingestion ranged from 3x10-6, (most probable occupational) to 7x10-5 (worst case adult residential). Risk associated with deep soil ingestion was calculated to be 6x10-7, most probable occupational exposure.

Hazard Indexes calculated for potential surface soil exposure through ingestion range from 2.8 (worst case adult residential; worst case occupational) to 39.4 (worst case 10-kg child residential exposure). The Hazard Index of soil below 1 foot was less than 1.0.

Canal Sediment

Contaminant concentrations in canal sediments are summarized in Table 4. Lead accounts for over 98 percent of the hazard indexes for adult (HI = 3.95), 35-kg child (HI = 15.8) and 10-kg child (HI = 55.3) worst case exposure scenarios. The potential carcinogenic risks estimated for exposure to canal sediments through ingestion range from 6x10-8 (most probable adult occupational) to 2x10-6 (worst case adult trespass).

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment

Table 2
DATA SUMMARY FOR CHEMICALS OF CONCERN IN SURFACE SOILS

Chemical of Concern	Observed Concentrations Maximum (ug/kg)	Observed Concentrations Mean (ug/kg)	Standard Deviation	Number of Detections/ Number of Samples
Aldrin	100	78	20	03/27
Antimony	8,400	3,300	1,000	01/27
Arsenic	22,000	8,500	5,700	26/27
Barium	1,120,000	295,500	306,000	27/27
Beryllium	1,500	600	200	03/27
Beta BHC	85	81.5	4.9	2/27
Bis(2-ethylhexyl)phthalate	7,800	--	--	01/27
Cadmium	17,000	3,800	3.3	27/27
Chromium	43,000	17,000	9,800	27/27
4,4-DDD	150	89.4	51.9	05/27
4,4-DDE	1,525	195	413	04/27
4,4-DDT	590	177	277	04/27
Dieldrin	350	139	183	03/27
Diethyl phthalate	150	--	--	01/27
Endosulfan	540	215	423	04/27
Heptachlor	170	102	212	01/27
Heptachlor epoxide	1,400	187	357	08/27
Lead	14,300,000	2,669,000	4,709,000	27/27
Mercury	900	190	210	16/27
PCB	12,400	4,045	4,883	05/27
Phenol	50,000	22,000	28,000	01/27
Silver	2,400	800	300	01/27
Zinc	1,410,000	344,900	417,000	27/27

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Table 3
DATA SUMMARY FOR CHEMICALS OF CONCERN IN
DEEP ONSITE SOILS

Chemical of Concern	Observed Concentrations Maximum (ug/kg)	Observed Concentrations Mean (ug/kg)	Standard Deviation	Number of Detections/ Number of Samples
Acetone	7,200	1,270	3,571	09/74
Barium	2,250,000	202,200	449,000	68/68
2-butanone	8,700	720	2,380	17/70
Bis(2-ethylhexyl)phthalate	12,000	3,345	5,301	12/67
Cadium	2,100	600	300	09/68
Carbon disulfide	770	247	357	03/23
Chlorobenzene	2,900	245	731	17/77
Chloroform	310	38	74	22/74
1,1-Dichloroethane	1,100	133	285	02/17
1,2-Dichloroethane	960	36.6	147.9	2/77
Ethylbenzene	19,000	882	2,672	25/77
Lead	11,700,000	695,000	2,220,000	67/68
Methylene chloride	620	284	218	06/74
4-Methyl -2-Pentanone	9,100	626	1,465	20/56
2-Methyl phenol	1,100	657	401	03/31
4-Methyl phenol	56,000	4,612	9,049	09/52
Naphthalene	91,000	6,682	13,040	23/77
PAHs	102,000	9,049	12,342	5/76
PCBs	1,975	544	837	3/23
Phenol	99,000	4,811	14,211	13/63
Selenium	1,200	600	600	03/68
Tetrachloroethene	3,200	310	736	24/100
Trichloroethene	10	6.8	2.4	29/77
1,1,1-Trichloroethane	4,100	201	771	05/74
Toulene	20,000	1,459	3,656	64/77
Xylene	120,000	6,485	19,275	30/62
Zinc	616,000	71,000	103,000	68/68

CVR146/055

Table 4
DATA SUMMARY FOR CHEMICALS OF CONCERN IN CANAL SEDIMENTS

Chemical of Concern	Observed Concentrations Maximum (ug/kg)	Observed Concentrations Mean (ug/kg)	Standard Deviation	Number of Detections/ Number of Samples
Barium	1,770,000	645,000	625,000	10/10
Beryllium	1,300	600	200	01/10
Bis(2-ethylhexyl)phthalate	100,000	38,300	34,490	02/10
Cyanide	4,400	1,320	1,100	10/10
4,4-DDD	280	80	133	04/10
4,4-DDE	19	--	--	01/10
Dieldrin	130	104	56	01/09
Endosulfan	230	149	272	01/10
Gamma BHC (Lindane)	84	47	32	01/09
Heptachlor	77	48	33	01/09
Heptachlor epoxide	1,400	210	425	04/10
Lead	13,200,000	3,815,000	5,017,000	10/10
Mercury	200	70	50	01/10
Naphthalene	54,000	29,500	23,699	02/10
Zinc	1,260,000	262,000	430,000	10/10

CVR146/051

to public health, welfare, or the environment.

VII. Description of Alternatives

A detailed evaluation of the alternatives for treatment of soil is presented in the April 12, 1989 Feasibility Study, the May 1992 Soil Solidification Feasibility and Cost Evaluation and the May 1992 Revised Soil Vapor Extraction and Cap Feasibility Study. Alternatives selected for discussion in the June 1992 Revised Proposed Plan for Soil are listed below.

Actual levels of soil contaminants vary with depth throughout the site. It should be noted that the 0-14 feet and 14-40 feet soil layers discussed are approximate levels only. Actual cleanup will depend on the depth of contamination at specific locations.

Alternative 1: No Action

The No Action Alternative serves as a "baseline" for developing the risk assessment, and its evaluation is required by law. It assumes that no action would occur at the site, allowing unrestricted access to contaminated soils.

Alternative 2: RCRA Equivalent Cap

Major Components of the Remedial Alternative. The major features of this alternative include covering the site with a multi-layer RCRA equivalent cap, and enclosing the North Central Canal in a reinforced concrete pipe.

Containment Components: The 6.8 acre site would be capped and closed as a RCRA Subtitle C landfill in accordance with the requirements specified in 22 CCR 66264.310 for landfill closure, which require a cap to have a permeability less than or equal to the permeability of the natural underlying soil.

The cap would be designed and constructed to promote drainage, minimize erosion of the cover, and provide long-term minimization of migration of liquids through the underlying soils. Consistent with the requirements of 22 CCR 66264.117, long-term operation and maintenance (O&M) would be conducted to monitor groundwater and to insure the integrity of the cap.

The cap proposed for the site (Figure 5) would consist of a 1 foot foundation layer, 2 feet of bentonite/clay mix, a high density polyethylene liner, 1 1/2 feet of sand followed by 2 feet of top soil, and a gas/drainage collection system. The total height of the cap would be 7 feet. A retaining wall to provide slope stability would be constructed around the cap. The top of the wall would be 5 feet above grade. The wall is anticipated to be 2 feet thick.

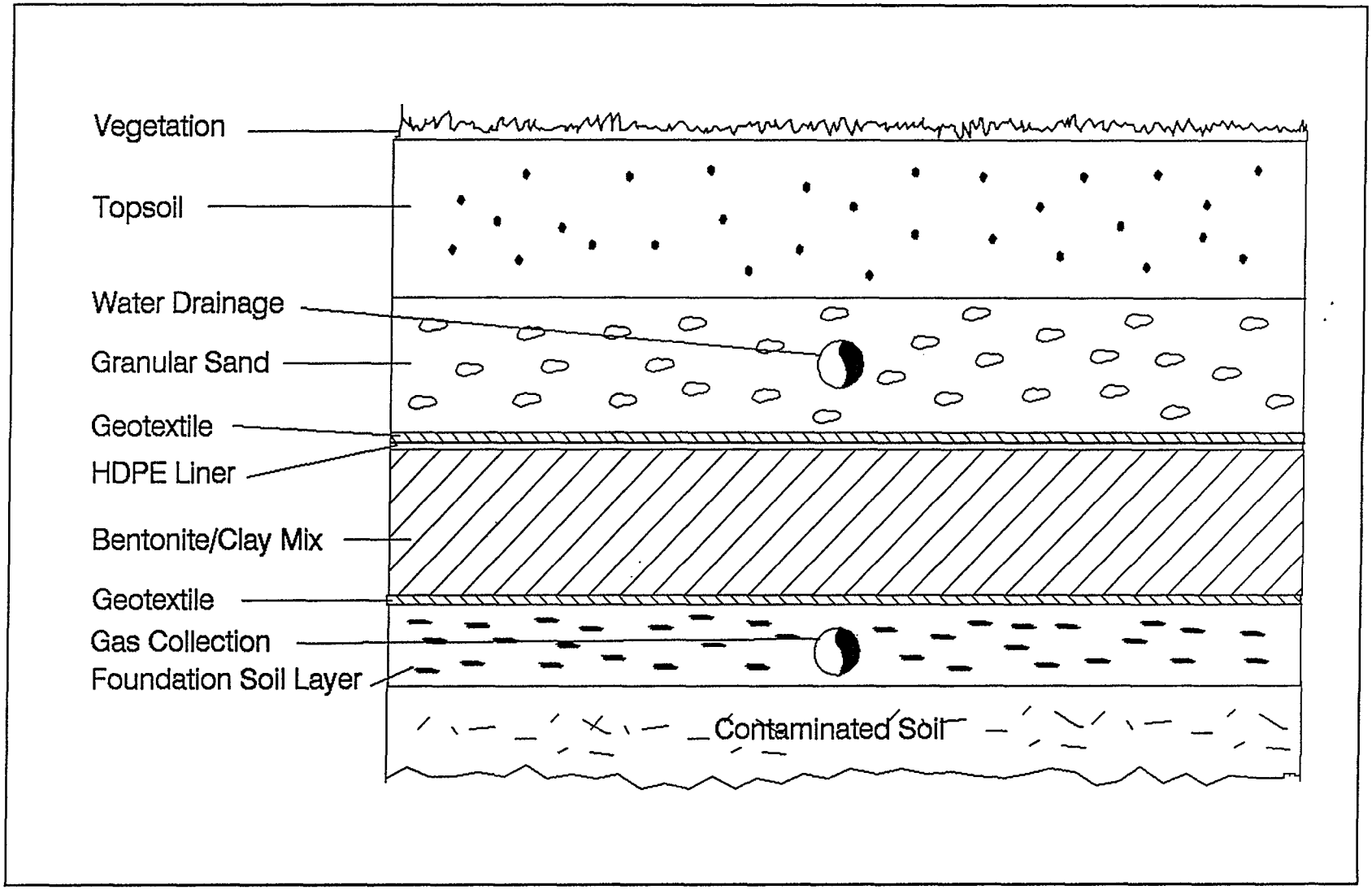

Figure 5: RCRA Equivalent Cap

Alternative 3: Soil Vapor Extraction (SVE) and RCRA Equivalent Cap with Slurry Walls

Major Components of the Remedial Alternative. The major features of this alternative include treating soils from 14 feet to the water table with Soil Vapor Extraction (SVE), constructing a slurry wall, covering the site with a multi-layer RCRA equivalent cap, constructing a retaining wall to support the cap, and enclosing the North Central Canal in a reinforced concrete pipe.

Treatment Components: Soil Vapor Extraction (Figure 6) is a process in which organic contaminants are volatilized from the soil, using a series of on-site air injection wells and extraction wells. The extracted Volatile Organic Compounds (VOCs) are then treated by carbon adsorption prior to discharge to the air. Carbon adsorption is a treatment system where the volatilized contaminants are forced through tanks containing activated carbon, a specially treated material that attracts the contaminants. The contaminants cling to the carbon, and the air leaving the system would meet air quality standards.

Soil from 0-14 feet is contaminated with oil and grease which would greatly inhibit the effectiveness of SVE wells. Therefore, SVE wells will treat soil from 14 feet to the water table. A significant amount of the VOCs in soil deeper than 14 feet (approximately 24,387 pounds) would be removed by the action of the SVE system. Approximately 25% or 17,950 pounds of VOCs in soil from 0-14 feet are expected to be drawn into the lower layers of soil and be treated by the SVE system. The SVE wells would be drilled through the RCRA cap and screened in Layers C,D, and E. The SVE system would operate in place underneath the cap.

Containment Components: Soil from 0-14 feet would be covered by a RCRA equivalent cap and surrounded by a slurry wall. See Alternative 2 for a discussion of a RCRA equivalent cap. A slurry wall acts as an underground barrier, surrounding the contaminated soil. The slurry wall, constructed of clay and soil, would be 25 feet deep which is 10 feet below the deepest level of Layer B, the most highly contaminated layer of soil.

Alternative 4: Excavation and On-site Incineration of Soil at 0-14 feet, SVE and Capping

Major Components of the Remedial Alternative. The major features of this alternative include excavation and treatment of soils at 0-14 feet with on-site incineration, stabilization of the incineration ash, treatment of soils from 14-40 feet with SVE, and covering the site with a soil and clay cap.

Treatment Components: Approximately 64,000 cubic yards of contaminated soil and canal sediment would be excavated and treated through rotary kiln incineration. The incineration process would destroy 99.99% of the principal organic hazardous constituents (POHCs) in soil from 0-14 feet. The results of a rotary kiln

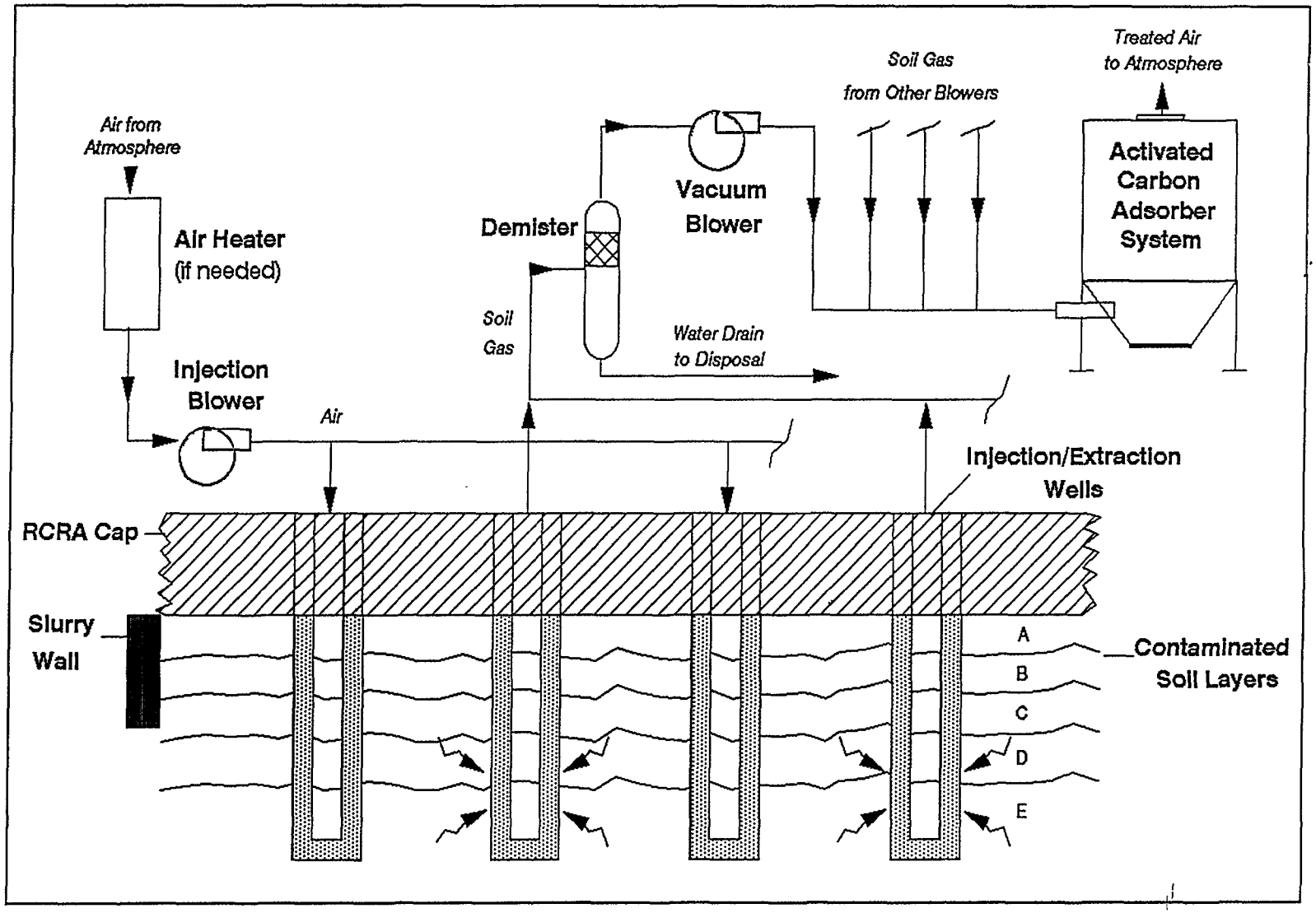

Figure 6 Soil Vapor Extraction System

incineration treatability study demonstrated that ash from the incinerator would fail the TCLP standard for lead. Therefore, ash would be solidified to immobilize lead in compliance with the Land Disposal Restrictions (LDR) treatment standard for lead of 5.0 milligrams/liter (mg/l).

Soil from 14-40 feet would be treated through SVE. See Alternative 3 for a discussion of SVE.

Containment Components: The site would be covered with a soil and clay cap. The soil and clay cap would consist of a 2 foot silty sand foundation layer, 2 to 3 feet of gravel and bentonite/clay mix, a 1 to 2 foot drainage sand layer followed by a 2 foot layer of top soil. The cap would be 8 feet high and would contain a drainage collection system.

Alternative 5: Excavation and Solidification of Soil at 0-10 Feet, SVE and Capping

Major Components of the Remedial Alternative: The major features of this alternative include excavation and treatment of soils at 0-10 feet with on-site solidification, treatment of soil from 14-40 feet with SVE and covering the site with a soil and clay cap.

Treatment Components: Approximately 38,000 cubic yards of material from Layer A and canal sediment would be excavated. Rubble larger than 3 feet in size would be removed from the excavated material and later returned to the excavation and backfilled with solidified material. The excavated material would be fed directly to a thermal unit to remove VOCs. The exhaust gas from the thermal unit would be treated in a venturi scrubber and a carbon adsorption system to remove particulates, sulfur dioxide, and VOCs. The material discharged from the thermal unit would be further screened to remove debris larger than 4 to 6 inches. This debris would also be backfilled with solidified material. The soil from the thermal unit would be transferred to a rotary mixer/blender (pugmill). Solid additives would be metered from storage bins or silos and fed to the pugmill. Similarly, measured flows of a liquid reagent would be fed into the pugmill. After mixing in the pugmill for a predetermined period, the processed soil would be discharged and placed back in the excavation.

Soils from 14-40 feet would be treated using SVE. See Alternative 3 from a discussion of SVE.

Containment Components: A soil and clay cap would be constructed over the stabilized material. See Alternative 4 for a discussion of the cap. The increase in site elevation due to solidification alone would be 2 feet. The total increase in site elevation due to solidification and installation of the cap would be 9 1/2 feet.

Alternative 6: Excavation and Solidification of Soil at 0-14 feet, SVE and Capping

Major Components of the Remedial Alternative. The major features of this alternative include excavation and treatment of soils at 0-14 feet with on-site solidification, treatment of soil at 14-40 feet with SVE and covering the site with a soil and clay cap.

Treatment Components: The treatment components for this alternative are similar to alternative 5. Approximately 64,000 cubic yards of material from Layers A and B and canal sediment would be excavated and treated in the thermal unit and then solidified.

Containment Components: A soil and clay cap would be constructed over the stabilized material. See Alternative 4 for a discussion of the cap. The increase in site elevation due to solidification alone would be 3 1/2 feet. The total increase in site elevation due to solidification and installation of the cap would be 11 feet.

Alternative 7: Excavation and Solidification of Soil Exceeding 500 ppm Lead, SVE and Capping

Major Components of the Remedial Alternative. The major features of this alternative include excavation and solidification of soils containing lead in excess of 500 ppm, treating the remaining soil with SVE, and covering the site with a soil and clay cap.

Treatment Components: The treatment components of this alternative are identical to Alternative 5. Approximately 69,680 cubic yards of soil containing lead in excess of 500 ppm and canal sediment would be excavated and treated in the thermal unit and then solidified.

Containment Components: A soil and clay cap would be constructed over the stabilized material. See Alternative 4 for a discussion of the cap. The increase in site elevation due to solidification alone would be 3/4 feet. The total increase in site elevation due to solidification and installation of the cap would be 11 1/4 feet.

Alternative 8: Excavation and Off-Site Treatment and Disposal of Soil at 0-14 Feet, SVE and Capping

Major Components of the Remedial Alternative. The major features of this alternative include excavation of soil from 0-14 feet and treatment and disposal at an off-site landfill, treatment of soil from 14-40 feet with SVE, and covering the site with a soil and clay cap.

Treatment Components: Approximately 64,000 cubic yards of contaminated soil and canal sediment would be excavated and transported off-site for treatment and disposal at a permitted hazardous waste disposal facility.

Soil from 14-40 feet would be treated using SVE. See Alternative 3 for a discussion of SVE.

Containment Components: The site would be covered with a soil and clay cap. See Alternative 5 for a discussion of the cap.

Table 5 provides cost estimates and cleanup times for each of the alternatives.

VIII. Nine Evaluation Criteria

EPA uses nine criteria, or standards, to evaluate alternatives for cleaning up a National Priorities List site. The nine criteria are summarized below:

1. Overall Protection of Human Health and the Environment

   Addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

   Addresses whether or not a remedy will meet all federal and state environmental laws and regulations, or provide grounds for waiving a particular ARAR.

3. Long-term Effectiveness and Permanence

   Refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met.

4. Reduction of Toxicity, Mobility and Volume (TMV) through Treatment

   Refers to the ability of a remedy to reduce the toxicity, mobility, and volume of the hazardous components present at the site.

5. Cost - 30-year present worth

   Evaluates the estimated capital, operation and maintenance costs of each alternative.

6. Short-Term Effectiveness

   Addresses the period of time needed to complete the remedy, and any adverse impact on human health and the environment that may be posed during the construction and implementation period, until the cleanup standards are achieved.

7. Implementability

   Refers to the technical and administrative feasibility of

TABLE 5

Alternative	Project Cost	Capital Cost	Annual Operation and Maintenance Cost	Estimated Cleanup Time in Years
#2 RCRA Equivalent Cap	$24,686,000	$8,016,000	$736,000	2
#3 SVE & RCRA Equivalent Cap	$36,254,000	$17,023,000	$741,000	9.4
#4 Incineration, 0-14 feet, SVE & Cap	$74,756,000	$57,780,000	$60,000	7.5
#5 Solidification 0-10 feet, SVE, Cap	$41,918,000	$31,992,000	$60,000	9.6
#6 Solidification 0-14 feet, SVE, Cap	$53,073,000	$40,752,000	$60,000	7.6
#7 Solidification 500 ppm lead SVE, Cap	$55,861,000	$42,942,000	$60,000	7.8
#8 Off-site Treatment & Disposal, 0-14 feet, SVE, Cap	$63,659,000	$49,066,000	$60,000	6.5

a remedy, including the availability of materials and services needed to carry out a particular option.

8. State Acceptance

Indicates whether, based on its review of the information, the state concurs with, opposes, or has no comment on the preferred alternative.

9. Community Acceptance

Indicates whether community concerns are addressed by the remedy, and whether or not the community has a preference for a remedy.

In order for an alternative to be eligible for selection, it must meet the first two criteria described above, called threshold criteria.

IX. Summary Analysis of Alternatives Against the Nine Criteria

An evaluation of the eight alternatives in relation to the nine decision making criteria is summarized below.

1. Overall Protection of Human Health and the Environment

All of the alternatives, with the exception of the "no action" alternative, meet this criterion by minimizing or eliminating the risks from direct contact with soils and by minimizing or eliminating the source of groundwater contamination.

2. Compliance with ARARs

All of the alternatives, with the exception of the "no action" alternative, meet this criterion. ARARs are not applied to the "no action" alternative since no activity is taking place.

Since the "no action" alternative is not protective of human health and the environment it will not be discussed further in the criteria analysis.

3. Long-term Effectiveness and Permanence

The alternatives involving treatment or removal of the upper layers of soil as well as treatment of the lower layers of soil, provide the highest degree of long-term effectiveness.

The selected alternative, Alternative #3, would leave waste in place in the upper layers. However, the waste will be isolated by the cap and slurry walls, thus eliminating direct contact with the waste material and minimizing leaching to groundwater. The selected alternative will undergo a review every 5 years to insure protection of human health and the environment as required by EPA when waste is left in place.

4. Reduction of Toxicity, Mobility and Volume through Treatment

All alternatives with the exception of Alternative #2, RCRA cap, would remove approximately 24,387 pounds of VOCs from soil below 14 feet through the action of the SVE system.

Alternative #3 assumes that 25% or 17,950 pounds of VOCs in the upper layers would move into the lower layers and be treated. The mobility of contaminants in all soil layers would be reduced by the cap and slurry walls.

The solidification alternatives, #5-#7, would reduce the toxicity, mobility and volume of both volatile organic and inorganic contaminants by heating the excavated waste to remove VOCs and then stabilizing the soil to encapsulate the inorganics, including lead.

Approximately 99.99% of the VOCs in the upper layers of soil would be destroyed through incineration, alternative #4. The incineration ash would be stabilized, thereby encapsulating the lead.

5. Cost

See Table 5. The total project cost is the present value of capital costs plus operation and maintenance costs.

6. Short-term Effectiveness

Alternative #2 would have the least short-term impacts on site workers and nearby residents and workers because there would be no excavation of the waste. All of the alternatives that have excavation components (Alternatives #3-7) would have short-term impacts on the community and workers due to air emissions generated during excavation. Air emissions would be controlled.

See Table 5 for estimated clean-up times.

7. Implementability

All of the alternatives employ treatment technologies that have been proven effective in the field. Additionally, treatability studies performed on site waste showed that incineration and stabilization were effective in treating the contaminated soil.

8. State Acceptance

The State Department of Toxic Substances Control supports the preferred alternative, Alternative #3.

9. Community Acceptance

No community members attended the June 22, 1992 public hearing on the Revised Proposed Plan for Soil or submitted written comments during the comment period. Potentially Responsible Parties submitted written comments which questioned the need for the SVE

system.

Table 6 provides a comparative analysis of the eight alternatives in relation to the nine criteria.

X. The Selected Remedy

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives using the nine criteria, and the lack of adverse public comments, both EPA and the State have determined that Alternative #3 (Soil Vapor Extraction and RCRA Equivalent Cap with Slurry Walls) is the most appropriate remedy for the Purity Oil Sales Site.

The first step in implementing this alternative, will be to construct a slurry wall along the site boundaries to minimize the migration of contaminants. The wall will be constructed by excavating a trench approximately 25 feet deep and 2 to 4 feet wide around the perimeter of the site. The trench will be filled with a slurry of soil mixed with bentonite clay. Rubble uncovered during excavation of the trench will depending on the level of contamination be transported off-site to an appropriate RCRA facility or disposed on-site. Foam will be applied as necessary to control emissions during construction of the slurry wall.

Following construction of the slurry wall, the site will be graded and all contaminated canal sediments will be excavated and spread over the site. It is estimated that approximately 500 cubic yards of sediment will require excavation. The western 2/3 of the site is 3 to 5 feet above the surrounding land due to the rubble used to fill the former waste pits. Approximately 8,600 cubic yards of imported soil will be used as fill material for the eastern 1/3 of the site. Foam will be applied during excavation and spreading of the canal sediment to control emissions. The entire length of the canal along the southern boundary of the site will then be enclosed in a reinforced concrete pipe.

The 6.8 acre site will then be covered with a cap capable of satisfying the requirements under RCRA Subtitle C for closure of a hazardous waste landfill. The cap should consist of a 1 foot foundation layer containing a gas collection system, 2 feet of bentonite/clay mix, a high density polyethylene (HDPE) liner, 1 1/2 feet of sand containing a drainage collection system, followed by 2 feet of top soil.

The gas collection system will deliver gases to a treatment system. The system will include a scrubber to remove sulfur dioxide (SO2) and a carbon adsorber to remove VOCs.

For SO2 removal, the treatment system will be designed for one scrubber to achieve a 95 percent SO2 removal efficiency. Scrubber blowdown, generated at an estimated rate of 16 gallons per day, will be shipped off-site for disposal.

TABLE 6

NINE CRITERIA LEVEL OF CONFIDENCE ANALYSIS

	ALT. 1	ALT. 2	ALT. 3	ALT. 4	ALT. 5	ALT. 6	ALT. 7	ALT. 8
PPHE	LOW	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH
ARARs	N/A	HIGH	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	HIGH
LTE&P	N/A	LOW	MEDIUM	HIGH	LOW	HIGH	HIGH	HIGH
STE	N/A	HIGH	HIGH	LOW	MEDIUM	MEDIUM	MEDIUM	MEDIUM
COST	N/A	$25	$36	$75	$42	$53	$56	$64
IMP.	N/A	HIGH	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	HIGH
RTMVT	N/A	LOW	MEDIUM	HIGH	LOW	HIGH	HIGH	HIGH
SA	N/A	LOW	HIGH	LOW	LOW	LOW	LOW	MEDIUM
CA	N/A	LOW	HIGH	LOW	MEDIUM	MEDIUM	MEDIUM	HIGH

PPHE - PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT
ARARs- COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS INCLUDING APPLICATION OF WAIVERS
LTE&P- LONG TERN EFFECTIVENESS AND PERMANENCE
STE - SHORT TERM EFFECTIVENESS
COST - TOTAL 30-YEAR PRESENT WORTH COST IN 1995 DOLLARS- IN MILLIONS
IMP. - IMPLEMENTABILITY
RTMVT- REDUCTION IN TOXICITY MOBILITY VOLUME THROUGH TREATMENT
SA - STATE ACCEPTANCE
CA - COMMUNITY ACCEPTANCE

ALT. 1- NO ACTION
ALT. 2- RCRA EQUIVALENT CAP
ALT. 3- RCRA EQUIVALENT CAP, SLURRY WALLS, RETAINING WALLS, SVE
ALT. 4- EXCAVATION, ON-SITE INCINERATION (0-14 FEET), SVE, CLAY CAP
ALT. 5- EXCAVATION, ON-SITE SOLIDIFICATION (29,000 CUBIC YARDS), SVE, CLAY CAP
ALT. 6- EXCAVATION, ON-SITE SOLIDIFICATION (55,000 CUBIC YARDS), SVE, CLAY CAP
ALT. 7- EXCAVATION, ON-SITE SOLIDIFICATION (69,680 CUBIC YARDS), SVE, CLAY CAP
ALT. 8- EXCAVATION, OFF-SITE SOLIDIFICATION (55,000 CUBIC YARDS), SVE, CLAY CAP

HIGH- HIGH LEVEL OF CONFIDENCE THAT CRITERION WILL BE ACHIEVED
MEDIUM- MODERATE LEVEL OF CONFIDENCE THAT CRITERION WILL BE ACHIEVED
LOW- LOW LEVEL OF CONFIDENCE THAT CRITERION WILL BE ACHIEVED
N/A- NOT APPLICABLE

For VOC removal, saturated gases from the scrubber will be heated by a natural gas fired duct burner to raise the gas temperature by approximately 20 degrees F to avoid condensation. One adsorber will be designed to achieve a 95 percent VOC removal efficiency. Another similar unit will be installed as a stand-by unit. It is assumed that 1 pound of activated carbon would adsorb 0.15 pounds of VOCs. The spent activated carbon will be disposed of off-site at a permitted RCRA facility.

A retaining wall will be constructed around the cap to provide slope stability. The wall will be designed to withstand the lateral movement from a maximum credible earthquake. It is anticipated that the top of the wall will be 5 feet above grade. The wall is anticipated to be approximately 2 feet thick and the foundation is anticipated to be approximately 3 feet deep.

Finally, SVE wells will be installed through the cap and screened in Layers C, D, And E. The radius of influence of the SVE system will cover the entire length and width of the site with the possible exception of the 2.5 acre "front yard" area and the .5 acre area south of the North Central Canal. Additional sampling and analysis will be performed in these areas during design to determine the nature and extent of contamination. If it is determined by EPA that the level of contamination in these areas poses a risk to human health and the environment, the design of the SVE system will insure that the radius of influence extends to these areas.

Based on a radius of influence of 30 feet, an air flow rate of 40 cfm and a VOC extraction rate of 0.5 lbs per day per well, EPA estimates that 58 wells will be required to cover the site.
All SVE wells will be screened as appropriate to provide coverage from 14 feet down to the water table. The wells will be designed to be used interchangeably as extraction or air injection wells.

A significant amount of the VOCs in soil deeper than 14 feet (approximately 24,387 pounds) will be removed by the action of the SVE system. Approximately 25% of 17,950 pounds of VOCs in soil from 0-14 feet are expected to be drawn into the lower layers of soil and be treated by the action of the SVE system. Tables 7 and 8 show the type and average concentration of the major VOCs in Layers A through E.

It is anticipated that four carbon adsorption systems, three active and one backup, will be needed to adsorb VOCs extracted from the soil. The amount of VOCs released to the atmosphere after treatment in the carbon adsorber will meet state and federal air quality standards.

Based upon the assumption that 25% of the VOCs in the upper layers will move downward, an operation period of approximately 80 months is anticipated for the SVE system. This assumes a system availability of 80 per cent due to maintenance. The actual operation time will be determined during design based on additional

TABLE 7
VOC CONCENTRATION IN SOIL LAYERS A & B

Contaminated Soil Layer	Type and Average Concentration of the Major Volatile Compounds[1]	
Layer A, average concentration of VOCs in soil	18,722 µg/kg (19 ppm)	
(Samples at depths of 1½ feet-5 feet)	Benzene	1.8%
	Ethylbenzene	6.6%
	Chlorobenzene	5.1%
	Toluene	28.8%
Total Soil in Layer A = 29,000 yd^3	Trichloroethylene	10.9%
	Tetrachloroethylene	6.5%
	Xylene	31.6%
	2-Butanone	8.4%
Total VOCs Present in Layer A	1,456 lb	
Layer B, average concentration of VOCs in soil	1,009,226 µg/kg (1,009 ppm)	
(Samples at depths of 5 feet - 12 feet)	Benzene	1.8%
	Ethylbenzene	15.1%
	Chlorobenzene	2.0%
	Toluene	29.1%
Total Soil in Layer B = 26,000 yd^3	Trichloroethylene	8.9%
	Tetrachloroethylene	6.3%
	Xylene	26.1%
	4-Methyl-2 Pentanone	2.5%
Total VOCs Present in Layer B	70,345 lb	

(1) The major compounds in Layer A are 97% of the total volatile organics in Layer A and the major compounds in Layer B are 88% of the total volatile organics present in Layer B.

TABLE 8
VOC CONCENTRATION IN SOIL LAYERS C, D, & E

Contaminated Soil Layer	Type and Average Concentration of the Major Volatile Compounds[1]	
Layer C, average concentration of VOCs in soil	134,134 µg/kg (134 ppm)	
(Samples at depths of 12 feet-20 feet)	Benzene	1.6%
	Ethylbenzene	12.3%
	Chlorobenzene	7.0%
	Toluene	26.2%
	Trichloroethylene	6.8%
	Xylene	22.0%
	2-Butanone	23.9%
Layer D & E, average concentration of VOCs in soil	42,512 µg/kg (43 ppm)	
(Samples at depths of 20 feet - 39 feet)	Toluene	7.6%
	Trichloroethylene	35.9%
	Methylene Chloride	26.2%
	4-Methyl-2 Pentanone	4.7%
	2-Butanone	6.0%

(1) The major compounds in Layer C are 94% of the total volatile organics in Layer C and the major compounds in Layers D and E are 80% of the total volatile organics present in Layers D and E.

TOTAL VOCs IN LAYERS C,D AND E

Layer	Amount of Contaminated Soil (yd^3)	Amount of Volatile Compounds (lb)
Layer C	45,000	16,181
Layers D and E	72,000	8,206

testing.

Once the cap and SVE system are constructed, monitoring wells will be installed in accordance with RCRA in the vadose zone and groundwater to determine if hazardous constituents are migrating from the site.

In order to protect the cap, deed restrictions will be imposed on the site to prohibit future excavation. The site may be suitable for light industrial uses once cleanup levels have been achieved.

Applicable or Relevant and Appropriate Requirements (ARARs)

ARARs are federal and state standards, requirements or levels of control that Superfund remedies must meet. The ARARs identified for the selected alternative are listed in Appendix 1.

Cleanup Levels

The purpose of this response action is to control risks posed by direct contact with soils and canal sediments and to minimize the migration of contaminants to groundwater.

The purpose of the SVE system will be to reduce VOC mass in the vadose zone from 14 feet to the water table to a level that no longer threatens to contaminate groundwater at levels above MCLs. The threat to groundwater will be evaluated through vadose zone monitoring and vadose zone contaminant transport modeling. The Vadose Zone Transport Model (VLEACH) or a similar analytical tool determined acceptable by EPA, will be used to determine contaminant transport through the vadose zone. Vadose zone monitoring and modeling data will be used by EPA to determine the need for additional SVE or monitoring wells and to determine when to stop operating the SVE system. Modeling information will be supplemented by soil boring data taken between selected SVE wells and above and below the screened intervals for each layer.

A request to evaluate the need to continue operation of the SVE system will not be considered by EPA until the SVE system has operated for a minimum of one year. This will allow the SVE system to draw down and treat the most mobile VOCs in Layers A and B.

The groundwater monitoring system installed in compliance with RCRA Subtitle C requirements and the SVE system will be maintained in perpetuity. If it is determined that MCLs are being exceeded after the SVE system has ceased operating, the SVE system and/or the groundwater extraction wells will be re-activated under the direction of EPA.

XI. Statutory Determinations

Under CERCLA section 121, EPA must select remedies that are protective of human health and the environment, comply with applicable or relevant and appropriate requirements (unless a

statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as their principal element. The following sections discuss how the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The selected remedy protects human health and the environment through treatment of VOCs in soil deeper than 14 feet, thereby eliminating them as a source of groundwater contamination. Also, approximately 25% of the VOCs in the upper 14 feet of soil will be drawn down to the lower layers by the action of the SVE system and be treated.

The RCRA equivalent cap minimizes the risks from direct contact with soils. The cap and slurry wall significantly reduce the potential for rainwater to leach contaminants from the soil into the groundwater.

There are no short-term threats associated with the selected remedy that cannot be readily controlled. In addition, no adverse cross-media impacts are expected from the remedy.

Compliance with Applicable or Relevant and Appropriate Requirements

The selected remedy will comply with all ARARs. The ARARs are presented in Appendix 1.

Cost-Effectiveness

EPA believes this remedy will eliminate the risks to human health at an estimated cost of $36,254,000, therefore the selected remedy provides an overall effectiveness proportionate to its costs, such that it represents a reasonable value for the money that will be spent.

The selected remedy assures a high degree of certainty that the remedy will be effective in the long-term because of the significant reduction of the toxicity and mobility of the wastes achieved through SVE and cap with slurry walls respectively.

Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable

EPA and the State of California have determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for the soils operable unit at the Purity Oil Sales site. Of those alternatives that are protective of human health and the

environment and comply with ARARs, EPA and the State have determined that this selected remedy provides the best balance in terms of long-term effectiveness and permanence, reduction in toxicity, mobility, or volume achieved through treatment, short-term effectiveness, implementability, cost, while also considering the statutory preference for treatment as a principal element and considering state and community acceptance.

The selected remedy significantly reduces VOC levels, one of the principal threats posed by the soil. This remedy will cost less than treatment of all soil layers or off-site disposal. The selection of a remedy which treats the contaminated soil is consistent with program expectations that indicate that highly toxic and mobile wastes are a priority for treatment and is often necessary to ensure the long-term effectiveness of a remedy.

Lead, the other principal threat at the site, will not be treated. However, the cap and slurry wall will prevent direct contact with contaminated soil, thereby eliminating the exposure pathway for lead.

Preference for Treatment as a Principal Element

By treating the contaminated soils by SVE, the selected remedy addresses one of the principal threats posed by the site through the use of this treatment technology. By utilizing treatment as a significant portion of the remedy, the statutory preference for remedies that employ treatment as a principal element is satisfied.

XII. Documentation of Significant Changes

The Proposed Plan for the Purity Oil Sales site was released for public comment in June 1992. The Proposed Plan identified Alternative #3, treatment of soil from 14-40 feet with Soil Vapor Extraction, RCRA equivalent cap, slurry wall and enclosing the North Central Canal, as the preferred alternative for soil remediation. EPA reviewed all written and verbal comments submitted during the public comment period. Upon review of these comments, it was determined that areas beyond the planned RCRA cap which are contaminated due to past site activities will be investigated further during design.

Contamination exists in surface and deep soil off-site. If further sampling and analysis during design indicates that these areas pose a threat to human health and the environment they will be remediated consistent with the design of the selected alternative. It is anticipated that off-site surface soil contamination will be excavated and brought on-site to be covered by the cap and that off-site deep soil contamination will either be excavated and brought on-site or remediated in place using SVE.

APPENDIX A

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

FEDERAL ARARS

Citation	Requirement Description	A	RA
I. Resource Conservation and Recovery Act (RCRA) as amended by Hazardous and Solid Waste Amendments (HSWA) (42 USC 6901 et seq.) Hazardous Waste Control Act (HWCA) (Health and Safety Code Section 25100-25395)	RCRA is the federal law providing requirements for hazardous waste management including criteria for the identification of hazardous waste and specific standards for the design, operation, and closure of hazardous waste treatment, storage, or disposal units and facilities. EPA has authorized California to administer the RCRA program. State regulations will be cited for the authorized portions of the program. RCRA requirements are generally applicable to CERCLA actions when the following conditions are met: (1) the waste meets the RCRA criteria for a listed hazardous waste or a characteristic hazardous waste, and (2) the waste is treated, stored or disposed (as defined in 40 CFR 260.10) after the effective date of the RCRA requirement.		
A. Characteristics of Hazardous Waste (CCR 66261.1-66261.126)	RCRA identifies a solid waste as a hazardous waste if it exhibits the characteristic properties of ignitability, reactivity, toxicity, or for liquid or aqueous wastes, corrosivity. The RCRA toxicity characteristic is based upon the leachability of designated constituents as measured by the Toxicity Characteristic Leaching Procedure (TCLP). Specific chemicals identified at Purity Oil which are currently included in the toxicity criteria are:	X	

Chemical	EPA HW No.	TCLP Maximum Concentration (mg/l)
Arsenic	D004	5.0
Barium	D005	100.0
Benzene	D018	0.5
Cadmium	D006	1.0
Chlorobenzene	D012	100.0
Chloroform	D022	6.0
Chromium	D007	5.0
Heptachlor	D031	0.008
Lead	D008	5.0
Mercury	D009	0.2
Methyl Ethyl Ketone	D035	200.0
Selenium	D010	1.0
Silver	D011	5.0
Tetrachloroethylene	D039	0.7
Trichloroethylene	D040	0.5

A = Applicable
RA = Relevant and Appropriate

	FEDERAL ARARS			
	Citation	Requirement Description	A	RA
LOCATION SPECIFIC	I. RCRA Location Standards (22 CCR 66264.18)	Portions of new facilities where treatment, storage, or disposal of hazardous waste will be conducted must not be located within 61 meters (200 feet) of a fault which has had displacement in Holocene time. Facilities located in a 100-year floodplain must be designed, constructed, operated and maintained to prevent washout of hazardous waste by a 100-year flood. Because the intent of these location standards is to reduce the potential for release of hazardous constituents due to special environment conditions, they are relevant and appropriate for the proposed closure activities.		X
ACTION SPECIFIC	I. Resource Conservation and Recovery Act (RCRA) (42 USC 6901 et Seq.) Hazardous Waste Control Act (HWCA) (Health and Safety Code 25100-25395)	RCRA Subtitle C requirements provide action-specific ARARs for CERCLA actions if the CERCLA hazardous substance is also a RCRA hazardous waste, and the CERCLA action constitutes waste treatment, storage, or disposal as defined by RCRA. RCRA storage requirements are applicable to waste storage after the effective date of November 19, 1980. RCRA treatment requirements are applicable to any method, technique, or process, including neutralization, to change the character or composition of a hazardous waste to render it less hazardous. RCRA disposal includes placement of hazardous waste into a landfill, surface impoundment, or other management unit. Movement of a RCRA hazardous waste originally disposed before November 19, 1980 may invoke the land disposal restrictions. Requirements for RCRA-permitted facilities are generally applicable to CERCLA activities that consist of treatment, storage, or disposal (TSD) of hazardous waste.		
	A. Permitted Hazardous Waste Facilities (22 CCR 66264.10)	Requirements for RCRA TSD facilities are not applicable because the proposed closure activities do not include treatment, storage, or disposal of RCRA hazardous waste. However, the requirements are generally considered relevant and appropriate because the remedy's closure of the unit is similar to a RCRA landfill or surface impoundment.		
	1. Groundwater Protection (22 CCR 66264.90)	There are three types of groundwater monitoring for TSD facilities required under RCRA: detection monitoring, compliance monitoring and corrective action monitoring. The groundwater monitoring program must be designed and operated to verify that hazardous constituents have not		X

A = Applicable
RA = Relevant and Appropriate

	FEDERAL ARARS			
	Citation	Requirement Description	A	RA
ACTION SPECIFIC	1. (Continued)	migrated beyond the outer containment layer prior to the end of post-closure care. The regulations are applicable to "regulated units" which are surface impoundments, waste piles, landfills, and land treatment units that received hazardous wastes after July 26, 1982. The RCRA-equivalent closure would not meet the definition of regulated unit. However, the closure includes leaving untreated waste in the ground. Therefore, groundwater monitoring requirements are relevant and appropriate for assuring effective protection.		
	2. Land Treatment Unsaturated Zone Monitoring (22 CCR 66264.90)	Because all wastes are not removed from the disposal area, vadose zone (unsaturated zone) monitoring requirements that require monitoring of soil and soil-pore liquids as feasible to determine whether hazardous constituents are migrating, are relevant. This requirement should be considered appropriate only to the extent that the remedial design can feasibly incorporate vadose zone monitoring.		X
	3. Closure and Post-Closure (22 CCR 66264.110-66264.120)	RCRA closure of a "regulated unit" requires minimization of the need for further maintenance or control; minimization or elimination of postclosure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products; and disposal or decontamination of equipment, structures, and soils. Because this alternative leaves hazardous constituents in place, closure and post-closure requirements are relevant and appropriate. The landfill at the Purity Oil site should be closed pursuant to these regulations.		X
	4. Landfill Closure and Post-Closure Care (22 CCR 66264.310)	Closure of a landfill requires a final cover designed and constructed to: prevent the downward entry of water into the landfill for a period of at least 100 years; function with minimum maintenance; promote drainage and minimize erosion of the cover; accommodate settling and subsidence so that the cover's integrity is maintained; and have a permeability less than or equal to the permeability of natural subsoils present. After final closure, all post-closure requirements contained in 22 CCR 66264.117 through 66264.120, including maintenance and monitoring, must be complied with throughout the post-closure care period. In addition, a control system designed to collect gases emitted from the buried waste and convey these gases to a treatment device is required unless it is demonstrated that significant amounts of toxic or flammable gasses will not be emitted from the buried waste.		X

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RA = Relevant and Appropriate

FEDERAL ARARS			
Citation	**Requirement Description**	**A**	**RA**
5. Land Disposal Restrictions for Hazardous Debris (22 CCR 66268, General) (57 FR 160, Hazardous Debris Rule)	Land disposal restrictions are applicable to RCRA wastes that are excavated and placed either offsite or onsite. Debris is defined as materials that are primarily non-geologic in origin such as man-made synthetic manufactured materials, or construction and demolition materials. On August 18, 1992, EPA promulgated treatment standards to be attained prior to land disposal of debris which is a restricted RCRA waste.	X	
II. Clean Water Act (CWA) (33 USC 1251-1376; 40 CFR 100-199) A. National Pollutant Discharge Elimination System (NPDES) (40 CFR 122-125)	Both onsite and offsite discharges from CERCLA sites to surface waters are required to meet the substantive CWA NPDES requirements, including discharge limitations, monitoring requirements, and best management practices. Only offsite CERCLA discharges to surface waters must be NPDES-permitted. Stormwater runoff that is channeled to a receiving water body is included under this requirement.	X	
III. Clean Air Act (CAA) (42 USC 7401 et seq.) National Emission Standards for Hazardous Air Pollutants (NESHAPs) A. Fugitive Emissions Sources (40 CFR 61.240)	Standards are given in the regulation for equipment that either contains or contacts a liquid or gas that is at least 10% by weight volatile hazardous air pollutants (VHAP), defined as regulated substances including benzene and vinyl chloride. Regulated equipment includes pumps, compressor pressure relief devices, sampling connection systems, open-ended valves or lines, valves, flanges and other connectors, product accumulator vessels and control devices or systems. Although the treatment units at Purity Oil are not expected to process VHAP at concentrations in excess of 10% by weight, these standards are still considered relevant and appropriate because their intent is to regulate and minimize VHAP emissions.		X

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RA = Relevant and Appropriate

FEDERAL ARARS			
Citation	Requirement Description	A	RA
B. Benzene Waste Operation Standards (40 CFR 61.344)	Owners or operators of chemical manufacturing plants, coke by-product recovery plants, petroleum refineries, or RCRA-permitted hazardous waste facilities that treat, store, or dispose of hazardous waste (TSDFs) from these three types of facilities must comply with benzene emission standards if they manage a total quantity of benzene in excess of 10 megagrams per year (11 tons/year). These standards include general treatment and operation requirements and specific requirements for surface impoundment (defined as waste management units containing liquids wastes or wastes with free liquids), tanks, containers, and oil-water separators. The surface impoundment operation standard requires that the unit be equipped with a cover that does not release detectable benzene emissions as indicated by an instrument reading less than 500 ppmv above background. Again, the treatment units at Purity Oil are not expected to manage in excess of 10 megagrams per year of benzene, but these standards are still relevant and appropriate.		X

A = Applicable
RA = Relevant and Appropriate

STATE ARARS				
	Citation	Requirement Description	A	RA
CHEMICAL SPECIFIC	I. Hazardous Waste Control Act (HWCA) (Health and Safety Code Section 25100-25395)	HWCA provides the state law for the management of hazardous waste including the state criteria for the identification of hazardous waste and standards for the design, operation, and closure of hazardous waste treatment, storage, and disposal facilities. While this program closely parallels the federal RCRA program it contains some components with requirements in excess or more stringent than RCRA.		
	A. Criteria for Identifying Hazardous Waste (22 CCR 66261.1-66261.126)	Hazardous waste may be identified according to any of the following criteria according to specified test procedures. Toxicity Criteria: Toxicity of hazardous waste is established by LD_{50} or LC_{50} criteria. Persistent and Bioaccumulative Toxic Substances: Total Threshold Limit Concentrations (TTLCs) and Soluble Threshold Limit Concentrations (STLCs) have been established to identify hazardous waste. Chemicals detected at Purity Oil that have STLC or TTLC values are the following: Chemical / STLC(mg/l) / TTLC(mg/kg) Arsenic 5 500 Barium 100 10,000 (excludes Ba SO_4) Cadmium 1.0 100 Chromium (total) 560 2,500 Copper 25 2,500 Lead 5 1,000 Mercury 0.2 20 Nickel 20 2,000 Silver 5 500 Trichloroethylene 209 2040 Vanadium 24 2,400 Zinc 250 5,000 Corrosivity Criteria: If, when a waste is mixed with an equivalent weight of water, a liquid is produced which corrodes steel according to EPA SW-846 Test Method 1110 SW-846, it is a hazardous waste. List of Special Wastes: These include baghouse and scrubber wastes such as from APCD's and drilling muds from oil and gas wells.	X	

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RA = Relevant and Appropriate

	STATE ARARS			
	Citation	Requirement Description	A	RA
LOCATION SPECIFIC	I. Porter-Cologne Water Quality Act (WC 13000-13806) (23 CCR 2510-2533) Class I Waste Management Units	New waste management units shall have a 61-meter (200-foot) setback from any known Holocene earthquake fault (23 CFR 2531). New and existing hazardous waste management units shall be immediately underlain by natural geologic materials with a permeability of not more than 10^{-7} cm/sec and shall not be located where porous soil could impair the ability of natural geologic materials to act as a barrier to vertical fluid movement. New and existing Class I units (hazardous waste management units) shall also be located outside of floodplains subject to inundation by floods with a 100-yr return period (23 CFR 2531). Alternatives to these standards may be considered under certain conditions if the standard is not feasible and the alternative is consistent with the performance goal and affords equal protection against water quality impairment. (See 23 CCR 2510 for specific conditions under which alternatives may be considered). These standards are relevant and appropriate for the RCRA cap because their intent is to prevent the release of hazardous waste through unusual environmental events.		X
ACTION SPECIFIC	I. Hazardous Waste Control Act (HWCA) (Health and Safety Code Section 25100-25395) A. Environmental Monitoring for Interim Status and Permitted Facilities (22 CCR 66264.90)	This article contains the requirements for the environmental monitoring of air, soil, and water for on-site facilities that treat, store, or dispose of hazardous waste. General requirements include a provision for groundwater monitoring. In addition, the requirements are relevant and appropriate for closure and post-closure monitoring assuming that the redisposed waste is nonhazardous.		X
	B. Landfill Closure and Post Closure (22 CCR 66268.310)	Closure of a landfill requires a final cover designed and constructed to: prevent the downward entry of water into the landfill for a period of at least 100 years; function with minimum maintenance; promote drainage and minimize erosion of the cover; accommodate settling and subsidence so that the cover's integrity is maintained; and have a permeability less than or equal to the permeability of natural subsoils present. After final closure, all post-closure requirements contained in 22 CCR 66264.117 through 66264.120, including maintenance and monitoring, must be complied with throughout the post-closure care period. In addition, a control system designed to collect gases emitted from the buried waste and convey these gases to a treatment device is required unless it is demonstrated that significant amounts of toxic or flammable gasses will not be emitted from the buried waste.		X

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STATE ARARS				
	Citation	Requirement Description	A	RA
ACTION SPECIFIC	C. Closure and Post-Closure for Interim Status and Permitted Facilities (22 CCR 66264.110-66264.120)	A hazardous waste management unit facility shall be closed in a manner that minimizes the need for further maintenance and controls, minimizes, or eliminates postclosure escape of hazardous waste, leachate, contaminated rainfall, or waste decomposition products to the ground or surface waters, or the atmosphere. Closure shall be completed within 90 days after receiving the final volume of hazardous waste. When closure is completed, all facility equipment and structures shall be properly disposed of, or decontaminated by removing all hazardous waste and residues. Post-closure care, including environmental monitoring, shall continue as long as the waste presents a potential threat to the environment. Closure and post-closure care requirements are relevant and appropriate because it proposes to leave either untreated or treated waste at the site within engineered containment systems. It is relevant and appropriate for the monitoring and containments used for the untreated waste and the wastes treated in situ.		X
	II. Porter-Cologne Water Quality Act (WC 13000-13806; 23 CCR 1050-2836).	The Porter Cologne Water Quality Act provides broad statutory authority to protect water quality by regulating waste disposal and requiring hazardous waste cleanup. Regulations for monitoring and corrective action are applicable to "persons responsible for discharges at waste management units which are closed, abandoned, or inactive on the effective date of the regulations," meaning that the SWRQC and the RWQCB have jurisdiction over waste disposal sites abandoned prior to the enactment of requirements (§ 2510.(g)). Porter-Cologne delegates standard-setting authority to the RWQCBs. The Central Valley RWQCB has not promulgated specific treatment performance standards.		
	A. Water Quality Monitoring for Classified Waste Management Units (23 CCR 2550)	Monitoring is required to detect leaks from waste management units and a corrective action program is required if leaks are detected. A waste management unit is broadly defined as an area of land where hazardous, designated, or nonhazardous waste is discharged. Owners and operators of new or existing landfills and surface impoundments shall monitor groundwater, surface water and the unsaturated zone as feasible. This requirement is applicable and generally complements the federal RCRA and state HWCA monitoring requirements.	X	

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STATE ARARS				
	Citation	Requirement Description	A	RA
ACTION SPECIFIC	B. Discharges of Waste to Land, Construction and Operation Requirements for Waste Management Units (23 CCR 2510-2601)	Waste management unit standards include design, construction, operation, and closure requirements for surface impoundments. Although alternative designs may be allowed if they are equally protective of water quality, specific requirements for Class I, or hazardous waste management units include the following: - New and existing waste management unit landfills must be operated to ensure that wastes will be a minimum of five feet above the highest anticipated elevation of groundwater. - Cutoff walls are required where there is a potential for lateral movement of fluid; the walls must be constructed a minimum of 5 feet into natural geologic material with a permeability of 10^{-7} cm/s or less. - Clay liners shall be at least 2 feet thick, of 90% relative compaction and maximum permeability of 1×10^{-6} cm/sec. - New and existing units must be closed with a cover consisting of 2 feet of foundation material, 1 foot of compacted top soil (permeability equal to the bottom liner), and the final cover must be graded to prevent ponding or erosion. - Post-closure care including monitoring, leachate collection, and cover maintenance must continue for as long as wastes present a threat to water quality. These standards are applicable under the assumption that hazardous wastes would be left in place at the closed unit.	X	
	III. San Joaquin Valley Unified Air Pollution Control District Rules and Regulations	The San Joaquin Valley Unified Air Pollution Control District has authority to implement the federal and state air quality management programs in Fresno through the State Implementation Plan. However, Fresno County Air Pollution Control District (FAPCD) "Rules and Regulations" remain in effect in Fresno County until the corresponding San Joaquin Valley Unified Air Pollution Control District Rules and Regulations are promulgated in the State Code of Regulations. The District is completing "Rules and Regulations" and has issued the following that may serve as ARARs for Purity Oil.		
	A. Rule 220.1 - New and Modified Stationary Source Review	All new stationary sources which emit affected pollutants (pollutants including VOCs, NO_x, SO_x, PM_{10}, lead, and reduced sulfur compounds, are subject to the following requirements:	X	

A = Applicable
RA = Relevant and Appropriate

STATE ARARS			
Citation	**Requirement Description**	**A**	**RA**
A. (Continued)	- Use of Best Available Control Technology (BACT) for emissions, - Emission offsets for nonattainment pollutants, and - Air quality modeling to show that NAAQS or CAAQS are not violated or an existing violation is not made worse. These requirements apply to proposed remedial activities including in situ vapor extraction and air pollution control device emissions.	X	
IV. Fresno County Air Pollution Control District (FAPCD) Rules and Regulations			
A. Rule 401 - Visible Emissions	Air contaminants shall not be emitted for a period longer than three minutes if they are darker than Number 1 on the Ringlemann Chart.	X	
B. Rule 404 - Particulate Matter Concentrations	Emissions may not contain more than 0.23 grams/m^3 of particulate matter at standard conditions.	X	
C. Rule 405 - Particulate Matter Emission Rates	Emission shall not exceed the values given by the following equations. $E = 3.59\ P^{0.62}$ $\quad P \leq 30$ tons/hour $E = 17.31\ P^{0.16}$ $\quad P > 30$ tons/hour Where: E = emissions in pounds per hour P = process weight in tons per hour	X	
D. Rule 406 - Sulfur Compounds	Sulfur compounds (measured as SO_2) shall not exceed 0.2 percent by volume of any discharge to atmosphere.	X	
E. Rule 408 - Fuel Burning Equipment	Equipment that burns fuel for the primary purpose of producing heat must not exceed the following emission limits: - Sulfur Compounds: 200 pounds per hour (Calculated as SO_2) - Nitrogen oxides: 140 pounds per hour (Calculated as NO_2) - Combustion Contaminants: 10 pounds per hour. Theses limit would apply to any air pollution control devices or process that use combustive processes.	X	

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OTHER REQUIREMENTS	
Document	**Requirement Description**
These guidelines provide the standard for compliance with previously cited RCRA requirements.	
I. RCRA Technical Guidance Document "Final Covers on Hazardous Waste Landfills and Surface Impoundments."	These guidelines specify a multilayer cover consisting of the following layers from top to bottom: • Vegetation/Soil: 60 cm (2 ft.) • Filter (Nominal Thickness) • Drainage: 30 cm (1 ft.) • Low Permeability Flexible Membrane Liner: 20 mil (minimum) • Low Permeability Soil: 60 cm (2 ft.) Optional layers and layer modifications include the addition of a gravel top surface for erosion control and the removal of the drainage layer in arid climates, the addition of biotic barriers to prevent damage by animals, and the addition of a gas vent layer to control gas emissions.
II. RCRA Groundwater Monitoring: "Technical Enforcement Guidance Document."	This comprehensive guidance document provides procedures to be followed for groundwater monitoring at RCRA TSD facilities.

APPENDIX B

EPA CONTRACT NUMBER 68-W9-0059
WORK ASSIGNMENT NUMBER 59-13-9921

RESPONSIVENESS SUMMARY TO PUBLIC COMMENT

REVISED PROPOSED PLAN FOR SOIL

PURITY OIL SALES SITE
MALAGA, CALIFORNIA

September 1992

Submitted to:
EPA Region IX

Submitted by:
ICF Technology, Inc.

RESPONSIVENESS SUMMARY

INTRODUCTION

This document provides EPA's responses to questions and comments received on the Revised Proposed Plan for Soil at the Purity Oil Sales Superfund Site. The Revised Proposed Plan was made available for public review and comment on June 8, 1992. A public hearing was held on June 22, 1992. A transcript of the public hearing is included as Attachment B. The public comment period was closed on August 10, 1992. EPA received the following six letters providing written comments on the plan:

- UNOCAL. "Steering Committee's Comments on the June 1992 Revised Proposed Plan for Soil Cleanup Purity Oil Sales Site Operable Unit No. 2." August 10, 1992.
- Department of Toxic Substances Control. "Purity Oil Sales Superfund Site, Comments on Proposed Plan for the Second Operable unit addressing Remediation of Contaminated Soils." August 10, 1992.
- Sinsheimer, Schiebelhut & Baggett (For the County of Fresno). "Purity Oil Sales Superfund Site." July 10, 1992.
- Sinsheimer, Schiebelhut & Baggett (For the County of Fresno). "Purity Oil Sales Superfund Site." August 10, 1992.
- Pacific Gas and Electric Company. "Purity Oil Sales Site, Proposed Operational Unit No. 2 (OU-2) Soil Clean-up Plan." August 10, 1992.
- International Technology Corporation. "Comments on Soil Remediation Alternatives for the Purity Oil Site." July 28, 1992.

Copies of these letters are attached to this document as Attachment A. The responses to comments in the letters have been organized into categories according to design components of the proposed plan. Each comment is marked with an alphanumeric code in the right-hand margin of the original letter. For example, a notation of "1A" indicates that the response to that comment will be found in the "A" response of Section 1 of this Responsiveness Summary (Slurry Wall Design and Construction).

COMMENTS AND RESPONSES

1. Slurry Wall Design and Construction

(A) The conceptual design of the slurry wall has been prepared with an objective of minimizing the lateral migration of contaminants from Layers A and B. The exact depth and length of the wall will be determined by EPA during design.

(B) Because the site soil is acidic in nature, it was assumed that a cement-bentonite wall may not be suitable. The type of cut-off wall will be determined during design based on an evaluation of the requirements and performance for the slurry wall.

(C) The determination of whether to dispose of the material excavated during construction of the slurry wall on-site or off-site will be made during design based on the chemical and physical characteristics of the waste. Foam will be applied to the excavated material as necessary to control emissions.

(D) Because waste will be left in place in Layers A and B, the SVE wells will be maintained in perpetuity. Therefore, it is not possible to install the slurry wall following the termination of the operation of the SVE wells.

2. Retaining Wall

(A) The waste at the site is a Resource Conservation and Recovery Act (RCRA) hazardous waste, based on exceedence of the Toxicity Characteristics Leaching Procedure (TCLP) standard for lead. Therefore, RCRA is an Applicable or Relevant and Appropriate Requirement (ARAR) and the site must be remediated and closed in accordance with RCRA. A hardened thin cap must meet the requirements under RCRA for hazardous waste landfill closure and operation and maintenance in order to be approved by EPA. If a hardened thin cap is approved by EPA during design, the need for a retaining wall to support the cap will be evaluated at that time.

(B) A retaining wall is assumed to be necessary to support the entire perimeter of the cap. If EPA determines during design that a conventional slope will provide adequate support and erosion protection in certain locations, then a retaining wall will not be constructed in these locations.

3. RCRA Cap

(A) A RCRA equivalent cap is necessary for the 2.4-acre "front yard" area. Based on information contained in the Feasibility Study (FS) prepared by CH2M Hill[1], the 2-foot-deep surface soils of this area are contaminated with organic compounds and a variety of metals. One soil sample showed a lead concentration of 5,680 ppm which exceeds the State Total Threshold Limit Concentration value for definition as a hazardous waste.

The FS[1] contains insufficient data to determine if surface soil is contaminated in the 0.5-acre southwest corner of the "back yard" area. Additional sampling and analysis will be required during design to determine if this area will be capped.

(B) It may be possible to combine the gas treatment systems of the cap and the soil vapor extraction (SVE) system. This determination will be made during design.

4. Soil Vapor Extraction System

(A) A Soil Vapor Extraction (SVE) system is necessary to remove volatile organic compounds (VOCs) in the soil and to minimize the leaching of VOCs to groundwater. Presently, nine VOCs in groundwater are exceeding MCLs.

(B) EPA recognizes that the SVE system design parameters, such as extraction well locations, well depth, extraction rates, and well spacing will be determined during the design stage. However, the radius of influence of the SVE system must cover the entire length and width of the site with the possible exception of the 2.5-acre "front yard" area and the 0.5-acre southwest corner of the site. The SVE system will treat soil from 14 feet to the water table.

Based on the proven performance of the air stripper and carbon adsorption technologies for removing VOCs, these systems were selected in the conceptual design. Any other relevant components that can enhance the effectiveness of the SVE system will be evaluated during design.

(C) In order to determine whether the SVE system can be eliminated from the "back yard" area south of the canal and from the "front yard" area, additional deep soil data will be required to determine whether contamination in this area poses a threat to human health and the environment.

(D) It is estimated that 25 percent of the VOCs in Layers A and B will be drawn down to the lower layers of soil by the action of the SVE system and be treated. The exact percentage of VOCs in the upper layers of soil which will be treated will not be known until system operation. The slurry wall is intended to surround the waste in Layers A and B and will not treat the waste.

(E) EPA concurs that SVE is a patented technology.

(F) EPA believes SVE is a viable technology for the site based on information in the Soil Solidification Feasibility and Cost Evaluation report pages 2-14 to 2-21.

5. Groundwater Monitoring Wells

(A) A groundwater monitoring program is required under RCRA 40 CFR 264.90-264.99, when RCRA hazardous waste is left in place. If the OU-1 groundwater monitoring wells can meet RCRA closure requirements, they can also be used for OU-2 monitoring.

6. Vadose Zone Monitoring

(A) Vadose zone monitoring (Land Treatment Unsaturated Zone Monitoring, 40 CFR 264.278), is considered a relevant and appropriate requirement, since untreated waste will be left in Layers A and B. It is recognized that the vadose zone well spacing and depths will be determined during design.

7. Compatibility of OU-1 and OU-2

(A) A decision regarding the installation of on-site groundwater extraction wells prior to OU-2 cap construction will be made during the OU-2 predesign phase.

(B) EPA believes that SVE wells can be installed in a manner that would minimize damage to the cap. The SVE wells will be maintained in perpetuity.

(C) The operation of the OU-2 remedy would be designed to minimize the potential for further groundwater contamination in exceedence of MCLs, thereby reducing the amount of time that OU-1 treatment system will be required to operate.

8. Predesign Phase of OU-2

(A) The remedial technical components of the selected remedy include an SVE system, a RCRA equivalent cap, and a slurry wall. Based on the Administrative Record, EPA believes this is the most appropriate remedy for the site.

9. Canal Enclosure

(A) Based on information provided in the CH2M Hill FS[1] (pages 1-15) the canal slopes are contaminated. Soil samples obtained from the canal slopes showed lead concentrations ranging from 1,200 mg/kg to 13,200 mg/kg which exceeds the California TTLC. Metals were also detected in samples from the canal bottom sediments.

(B) If it is determined during design that the southwestern corner of the site is contaminated, a decision will be made to either relocate the canal or to excavate the contaminated soil and place it under the cap north of the canal.

10. SVE Operation and Maintenance Period

(A) The SVE system operation and maintenance (O&M) period is defined as the time required to achieve the clean-up levels for VOCs. The SVE operation parameters, such as air extraction rates, VOC concentrations in the extracted air, and radius of influence will be determined during design.

11. Operation and Maintenance Cost Estimate

(A) The cost estimate of $36,254,000 for Alternative No. 3 in the "Revised Proposed Plan for Soil Clean-up" includes 80 months of costs for operating the SVE system. As shown in Table 3-4 of the "Revised Soil Vapor Extraction and Cap Feasibility Study" report[2], dated May 1992, the estimated costs of $36,254,000 includes $701,000 for labor to operate an SVE system for a period of 80 months.

(B) EPA recognizes that the actual O&M time and cost for an SVE system can not be determined until design is completed. EPA expects that if the actual O&M time is significantly less than the estimated 80-month period, total O&M cost will be proportionally lower than the cost estimated in the FS[2].

(C) Licensing costs for patented SVE technology were not included in the evaluation of the conceptual design. The conceptual cost estimate is, however, within the -30 percent, +50 percent range of accuracy as required by the NCP.

12. Basis for Estimating VOCs Mass

An average concentration of VOCs in each soil layer was determined by averaging the analytical results of the RI[3] and Final Supplemental Report - Soil and Canal Water Sampling[4] as indicated below.

(A) **RI Report Average**: Figure 4-1 and Figures 5-4 through 5-22 were used to obtain the required data. The total VOCs for the samples obtained from Soil Layer A (0- to 5-foot depth) at the cross-sections No. 2, No. 7, No. 8, and No. 9 were averaged. Thus, the average value for Soil Layer A was estimated at 18,722 µg/kg.

The total VOCs for the samples obtained from Soil Layer B (5- to 12-foot depth) at the cross-sections No. 1, No. 2, No. 3, No. 4, No. 5, No. 6, No. 7, No. 8, and No. 10 were averaged. The average value for Soil Layer B was estimated at 41,452 µg/kg.

The total VOCs for the samples obtained from Soil Layer C (12- to 20-foot depth) at the cross-sections No. 4, No. 5, No. 6, No. 7, and No. 8 were averaged. The average value for Soil Layer C was estimated at 20,768 µg/kg.

The total VOCs for the samples obtained from Soil Layers D and E (20- to 30-foot depth) at the cross-sections No. 1, No. 2, No. 3, No. 4, No. 5, No. 6, No. 7, No. 8, No. 9, and No. 10 were averaged. The average value for Soil Layers D and E was estimated at 975 µg/kg.

(B) **Supplemental Report Average.** The information provided in Figures 3-1, 3-5, 3-2, and 3-8 was used to obtain the required data. The VOCs concentrations in these figures were based on an analytical extraction procedure. For mass estimation purposes only the VOCs extract concentrations were converted into total concentrations per soil mass (µg/kg soil unit). The sample results are given for the three cross-sections namely SB-15, SB-16, and SB-17.

There was no sample obtained for Soil Layer A at any of the cross-sections.

For Soil Layer B, two sample results are given at the cross-section SB-15. At the cross-sections SB-16 and SB-17, no samples were obtained from Soil Layer B. The average concentration of total VOCs for Soil Layer B was estimated at 1,977,000 µg/kg.

Soil analyses for Soil Layer C include 4 samples at cross-section SB-15, 2 samples at cross-section SB-16, and 3 samples at cross-section SB-17. Based on these sample analyses, the average concentration of total VOCs for Soil Layer C was estimated at 247,500 µg/kg.

The average concentration of total VOCs for Soil Layers D and E was estimated at 42,512 µg/kg based on two samples at cross-section SB-15.

(C) **Estimate of VOCs Mass.** Based on average concentrations of VOCs and the volume and weight of the different soil layers, the total VOCs mass in each layer was estimated as follows:

Soil Layer	Soil Volume and Weight	Average VOC Concentration (µg/kg)	Total VOC Mass (lbs)
Layer A	29,000 yd^3 (38,860 tons)	18,722	1,456
Layer B	26,000 yd^3 (34,840 tons)	1,009,226	70,345
Layer C	45,000 yd^3 (60,300 tons)	134,134	16,181
Layers D and E	72,000 yd^3 (96,480 tons)	42,512	8,206

This estimation was made solely for the purpose of conceptual design.

13. Remediation Managerial Concerns

(A) EPA has concluded that in its current condition, the site poses an unacceptable human health risk and that both groundwater and soil remediation are necessary. The Hazard Index for potential surface soil exposure indicates unacceptable health effects may result. Also, VOCs in the soil are leaching to groundwater and causing MCLs to be exceeded.

(B) In keeping with the NCP program management principles for RI/FS (40 CFR 300-430), EPA prefers to address the soils and groundwater operable units at the Purity Oil site independently and will address the optimum design of the selected technologies during design. The NCP directs that "sites should generally be remediated in operable units when early actions are necessary or appropriate to achieve significant risk reduction quickly, when phased analysis and response is necessary or appropriate given the size or complexity of the site, or to expedite the completion of total site cleanup."

(C) EPA is satisfied with the results of the RI which demonstrated a correlation between chemicals found in soil and those found in groundwater at the Purity Oil site.

14. Identification of the Preferred Alternative

EPA identified the preferred alternative after a detailed analysis of all of the alternatives against nine criteria standards in accordance with the NCP (40 CFR 300.430). As required by the NCP, all alternatives were evaluated for attainment of the first two, or threshold criteria: (1) Overall protection of human health and the environment, and (2) Compliance with ARARs. These two criteria must be met in order to be eligible for selection. All alternatives that met the threshold criteria were then evaluated according to the next five balancing criteria: (3) Long-term effectiveness and permanence, (4) Reduction of toxicity, mobility or volume through treatment, (5) Short-term effectiveness, (6) Implementability, and (7) Cost. No single criterium was the basis for selection of the preferred alternative.

15. Identification of Additional Potentially Responsible Parties

Thank you for this information. EPA is investigating whether current or former owners or operators of the 0.5 acre parcel APN 330-06-05 should be added to the list of Potentially Responsible Parties at the Purity Oil Superfund Site.

16. Soil Cleanup Levels

Soil cleanup levels will be designed to insure that VOCs remaining in soil will not cause contamination of groundwater in exceedence of MCLs.

17. Extent of Remediation

During design, additional sampling and analysis will be performed on off-site, site related contamination. If it is determined that these areas pose a risk to human health and the environment, they will be remediated consistent with the selected remedy.

REFERENCES

(1) CH2M Hill. "Public Comments - Feasibility Study Reports" EPA WA 3-9L21.1. April 12, 1989.

(2) ICF Technology. "Revised Soil Vapor Extraction and Cap Feasibility Study" EPA WA 59-13-9921. May 1992.

(3) CH2M Hill. "Remedial Investigation Reports, Vol. 1" EPA WA 3-9L21.1. October 1988.

(4) CH2M Hill. "Final Supplemental Report - Soil and Canal Water Sampling at Purity Oil Site" EPA WA 3-9L21.1. August 1990.

Attachment A

COPIES OF COMMENT LETTERS

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1201 West 5th Street, P.O. Box 7600
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Telephone (213) 977-6382

UNOCAL 76

August 10, 1992

Ian A. Webster
Manager, Superfund Technical Response

Ms. Janet Rosati
U. S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105

Steering Committee's Comments on the
June 1992 Revised Proposed Plan for Soil Cleanup[1]
Purity Oil Sales Site Operable Unit No. 2

Dear Ms. Rosati:

EPA's preferred Alternative No. 3 identified in the June 1992 Revised Plan for Soil Cleanup at the Purity Oil Sales Site is comprised of a RCRA equivalent cap, SVE system and slurry cut-off wall. The Purity Steering Committee has some concerns regarding the appropriate component configurations and the extent to which they may be required for all site locations.

For the sake of succinctness, our concerns are presented in Table 1, attached. Of particular concern are:

- We do not believe that EPA has established a sufficient rationale for requiring the installation of either a slurry wall or an SVE system, or both. The data which we have reviewed indicates that the levels of contamination are so low, and pose such minor risks, that an engineered cap is entirely adequate to contain the contaminants and prevent them from migrating into the ground water or laterally onto adjacent properties. **1A 4A**
- If the slurry wall or the SVE system are ultimately required, we believe that the design parameters of these elements, and the extent to which they are to be constructed, should be determined only after taking into account the specific site conditions and the future impact on those conditions on a cap. **1A 4B**
- The Record of Decision (ROD) must reflect the need to:
  - Perform predesign tasks required to determine the appropriate configurations and locations for the preferred alternative components.
  - Base the final design details on the evaluation of data collected in prior EPA studies and the predesign activities.

See Responses

---

(1) Submitted on behalf of the Purity Oil Steering Committee (PSC). PSC members complying with AO NO 91-28 are Chevron Corporation, Unocal Corporation, Morrison-Knudsen Corporation, Brown and Root, Inc., and BHP Utah International (as a joint venture); Pacific Gas and Electric Company, Inc.; Cummins West, Inc., Foster Poultry Farms; California Department of Transportation; and Southern Pacific Transportation Company.

Table 2, attached, discusses several important, but not major, concerns that should also be addressed by EPA. Attachment I summarizes some of the types of predesign activities that may need to be accomplished. Attachment II provides some suggestions for the ROD, to insure that the document incorporates sufficient flexibility to permit the best design to occur.

We understand that EPA will be preparing a responsiveness summary to the OU-2 Proposed Plan. The Steering Committee asks that EPA address in its responsiveness summary each of our "bulletized" concerns in Tables 1 and 2.

If you have any questions regarding our comments, please do not hesitate to contact me at (213) 977-6382. Thank you for your cooperation.

Sincerely,

Ian A. Webster
Representing the OU-1 Respondents

IW:dh
Attachments

TABLE 1

MAJOR TECHNICAL COMMENTS
PURITY OIL SALES SITE (OU-2)

COMPONENT	EPA ASSUMPTION	COMMENTS	
Slurry Wall	A 25-foot deep bentonite slurry wall would be constructed around the entire site boundary.	• The need for a slurry wall, its depth and location should be based on site conditions and requirements. Potential areas where a cut-off wall may not be required include: - Areas below the depth of buried waste (about 14 feet) where a proposed soil vapor extraction (SVE) would be operating; - Around perimeter of "front yard;" - Areas where other components may remediate a zone (e.g., if canal is directed through a pipe a large buffer zone would be created between unremediated site and accessible boundary); - Where existing boundary may be sufficient to prevent lateral migration of site material.	1A
		• Bentonite slurry, which will settle and could become dry and cracked with time may not be the appropriate material for the cut-off wall. The type of cut-off wall (e.g., bentonite slurry, cement bentonite, HDPE liner) should be determined based on predesign evaluations of requirements and anticipated performance.	1B
Retaining Wall	A 2,700-foot long, 8-foot high and 2-foot thick retaining wall would be installed to contain the perimeter of the cap.	• The potential need for a stabilizing wall may be significantly reduced if a hardened thin cap is installed as opposed to the thicker, multi-soil layer cap.	2A
		• There may be locations along the perimeter of the cap where a conventional slope would provide adequate stability and erosion protection (e.g., at the front yard area).	2B
RCRA Equivalent Cap	The entire 6.8-acre site would be covered with a 6.5-foot thick cap (1-foot foundation layer, 2 feet of bentonite/clay mix), HDPE liner, 1.5 feet of sand, and 2 feet of topsoil. A gas collection system would be included in the foundation layer.	• A thinner 2-foot hardened cap (HDPE liner, 1-foot reinforced concrete, and 1-foot vegetation layer) would reduce infiltration, control potential migration, and prevent access to site material with the potential to reduce the need for any retaining wall requirements.	2A
		• At least two areas onsite may not require a cap, including: (1) the 2.4-acre "front yard" where there are no buried wastes; and (2) the 0.5-acre southwest corner of the back yard (south of the canal) where there also are no historic waste disposal activities.	3A
SVE	58 wells to a depth of 40 feet, operating with a 30-foot radius of influence. The wells would operate as follows: 44 extraction and 14 injection at a given time.	• By EPA's calculations, if the Hazard Index for all constituents below 1-foot is below 1, why is a SVE system necessary, especially if a low permeability cap is installed?	4A
		• If an SVE system is deemed necessary, its location, depth, extraction rate, and well spacing should be based on studies during the predesign stage.	4B
		• An SVE system is not required in all areas, especially in the front yard and back yard areas south of the canal.	4C
Ground Water Monitoring Wells	Approximately 18 additional wells will be added.	• The need for any additional wells in ground water would be more appropriately addressed in Operable Unit (OU-1). Current activities under OU-1 include developing an extraction and treatment system in the area of the site which presently has over 40 monitoring wells that are sampled on a quarterly basis.	5A
Vadose Zone Monitoring Wells	27 wells along the perimeter of the slurry wall at 120-foot centers (except along trailer park where they will be at 60-foot centers).	• If an SVE system, cap and slurry wall are installed to prevent any existing site material from migrating while the site presently shows no indication of gas migration, it appears that the extent of this activity is not necessary or much greater than required.	6A
		• If required, vadose zone well spacing should be determined during predesign activities.	
Compatibility of OU-1 and OU-2	Operable units are not related - separate projects/separate schedules.	• The operable units are technically and programatically linked. For example: - The ground water monitoring program of OU-1 can equally satisfy the ground water monitoring requirements of OU-2.	5A
		- The installation of onsite ground water extraction wells for OU-1 should occur after the OU-2 cap has been constructed.	7A
Predesign Phase of OU-2	EPA's approach appears to be too prematurely quantifying component numbers and condition.	• The predesign phase is the appropriate project phase wherein to conduct actual onsite studies to determine the size, type and number of the remedial technical components. The proposed plan and the ROD should not be so technology-prescriptive that the most appropriate remedy cannot be implemented.	8A

92-150 (8/10/92/dh)

TABLE 2

SUPPLEMENTAL COMMENTS
PURITY OIL SALES SITE (OU-2)

TOPIC	EPA ASSUMPTION	COMMENTS	
Canal Pipe Enclosure	A detailed description of this activity was not included in EPA documentation	There is no indication that the site is causing contamination at the canal. FID has indicated a desire for a pipe section along the site boundary as part of its regular maintenance program.	9A
SVE O&M Period	EPA has assumed a nine- to ten-year SVE system O&M period	It may be reasonable at this time to assume a 10 year O&M period for the SVE system operations. However, this is much longer than is typically required at the hundreds of sites where soil vapors are being remediated by this technique. The actual time for operating the SVE system should be determined by criteria established during predesign. This criteria should be evaluated upon the quality of gas which is reasonably expected to be recovered based on predesign pilot tests and calculations or modeling to evaluate the threat of vapors to ground water quality considering potential infiltration conditions after installation of the cap.	10A
O&M Cost Estimate	Alternative No. 3	It appears that the $36,254,000 cost estimate for Alternative No. 3 in the Revised Proposed Plan for Soil Cleanup includes 30 years of costs for operating the SVE system. This results in an over-estimate of O&M costs with respect to the maximum anticipated 10-year SVE system operational period. This suggests that the estimated cost for O&M period should be reduced to reflect the actual estimate of SVE system operation. This would result in a decrease in the cost estimate of about $6,000,000.	11A

92-150 (8/10/92/pm)

ATTACHMENT I
EXAMPLE PREDESIGN ACTIVITIES

- Evaluation of subsurface conditions at the project boundary and areas between the boundary and buried wastes to determine: (1) the required locations and design requirements for the bentonite slurry (or equivalent) cut-off wall; and (2) handling procedures for soils and rubble removed during cut-off wall construction.
- Evaluation of the extent of contamination, if any, in the portions of site with no buried wastes to determine the appropriate: (1) limits for the engineered cap and soil vapor extraction (SVE) system; and (2) location for the cut-off wall. These areas include the entire eastern "front yard" area and all of the area south of the north dike of the North Central Canal.
- Evaluation of the variability of soils (from existing boring data) in the area where SVE wells will be installed to determine the range of conditions for pilot testing during Predesign activities.
- Operation of SVE system pilot tests so that the zone of influence, spacing and number of wells can be determined.
- Soil sampling through layers A and E to determine a better estimate of the mass of Volatile Organic Compound (VOC) to be treated by the SVE. Determine locations, if any, and depths where site wastes may need to be contained by a cutoff wall.
- Compatibility of OU-1 and OU-2 activities.
- Evaluation of cap configuration alternatives, and especially the relative merits of a thin hardened cap in comparison with a thick multilayered soil cap.
- Evaluation of the locations, if any, where a special cap edge containment (e.g., crib wall) is required, considering cap thickness and material, and the available space for using conventional soil slopes.

ATTACHMENT II
ROD FORMAT REQUIREMENTS

- The ROD wording choice should preserve critical decisions about design details until predesign activities are completed.
- The "Site Characterization" section of the ROD should point out that: (1) certain of the site characteristics require further understanding to draw final conclusions regarding the remedy component configurations; and (2) that additional data developed during Predesign will be used for that purpose.
- The "Changes to the Proposed Plan" section of the ROD should indicate that the specific dimensions and materials identified for the remediation components may be altered as a result of predesign investigations, so long as the selected configurations satisfy the criteria used to evaluate the alternatives (Reference: Page 8 of U.S. EPA's June 1992 Revised Proposed Plan announcement).
- The "ARARs" section should include a waiver of the land ban requirements if they could potentially be applied to the excavation and replacement (after additives are included) of soil at the cut-off wall. Also, there is not an ARAR for vapor in the soils. Therefore, the ROD should not attempt to establish a performance standard for this factor. Instead, the SVE performance requirements should be determined during Predesign based on additional soil samples, SVE testing and assessment of the potential for contaminant migration subsequent to installation of the engineered cap.
- The "Selected Remedy" section of the ROD should also assure sufficient flexibility for incorporating results of the Predesign analysis into final component configuration selection.

STATE OF CALIFORNIA — ENVIRONMENTAL PROTECTION AGENCY PETE WILSON, Governor

DEPARTMENT OF TOXIC SUBSTANCES CONTROL
10151 CROYDON WAY, SUITE 3
SACRAMENTO, CA 95827-2106
(916) 855-7700

August 10, 1992

Mr. Dave Jones
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105

PURITY OIL SALES SUPERFUND SITE, COMMENTS ON PROPOSED PLAN FOR THE SECOND OPERABLE UNIT ADDRESSING REMEDIATION OF CONTAMINATED SOILS

Dear Mr. Jones:

The State of California, Department of Toxic Substances Control (DTSC), hereby submits the following comments on the Proposed Plan for the soil cleanup at the Purity Oil Sales Superfund Site (site).

DTSC concurs with the conceptual aspects of the preferred alternative as presented in the June 1992 Proposed Plan Fact Sheet, Purity Oil Sales Superfund Site. Specifically, we believe that the construction of a soil vapor extraction system, capping the site, construction of a slurry wall around the site and the enclosure of the canal are necessary steps towards the goal of a final and permanent solution at the site.

Even though we concur with the Proposed Plan, we have several concerns which we hope to resolve by working with the U.S. Environmental Protection Agency (EPA) in the development of the Record of Decision (ROD) for the soils cleanup. These concerns are basically as follows:

1. Cleanup standards for the soils which are protective of the groundwater should be developed. EPA should use the data from pilot studies to demonstrate that those standards can be met by soil vapor extraction or a variation thereof and to establish baseline design parameters. 16

2. The soils cleanup, as described in the Proposed Plan and the Feasibility Studies, does not address the cleanup of several areas where the soils are known to be, or suspected of being, contaminated. The ROD for the soils cleanup should address all areas of known contamination and include additional investigations to determine whether cleanup is necessary in areas of suspected contamination. 17

3. The emplacement of numerous wells through a permanent cap may unnecessarily compromise the integrity of the cap. This can easily be avoided by constructing a temporary cap until the soil vapor extraction wells have served their function and are removed. The permanent cap should be constructed after the completion of vadose zone remediation activities. 7B

Please see the enclosed memorandum which gives the details with regard to the above items and our additional comments on the proposed slurry wall and the relocation of the canal.

Thank you for your continuing cooperation with DTSC towards achieving a remedy to the extensive contamination at the Purity Oil Sales Site and we look forward to working with you in the future.

Sincerely,

Anthony J. Landis, P.E.
Chief, Site Mitigation Branch

Enclosure

cc: Ms. Janet Rosati
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105

Mr. Scott Nevins
Regional Water Quality Control Board
3614 East Ashlan Avenue
Fresno, California 93755

cc: Mr. Tim Casagrande
Fresno County Dept. of Health Services
1221 Fulton Mall (Brix-Mercer Building), 3rd Floor
Fresno, California 93721

Mr. Martin Keast
San Joaquin Valley Unified Air Pollution Control District
P.O. Box 1312
Fresno, California 93715

Mr. Ramon Perez
Department of Toxic Substances Control
P.O. Box 806
Sacramento, California 95812-0806

State of California

Department of Toxic Substances Control

Memorandum

To : Tony Landis, P.E.
Chief, Site Mitigation Branch

Date: August 10, 1992

Via: Donn Diebert, P.E., Chief
National Priority List Unit

From : Site Mitigation Branch
10151 Croydon Way, Suite 3
855-7861

Subject: Purity Oil Sales: Comments on Proposed Plan for Soils Record of Decision (ROD)

The following memorandum sets forth my concerns with regard to the Proposed Plan and the Feasibility Studies for the Soils Operable Unit at the Purity Oil Sales Superfund Site. A general layout of the facility is provided as Attachment 1 for your reference.

The primary areas of concern which will be discussed in this memorandum are outlined below:

1. Soil Vapor Extraction ("SVE") System:

   a. Standards have not been developed for determining when the remediation due to the operation of the SVE system is completed. 16

   b. There is a lack of data which is necessary to support a favorable judgment on the viability of SVE as an effective remediation technique at the Purity Site. Also, there is insufficient data to make a determination as to the number of SVE wells which will be required. 4B 4F

   c. The Proposed Plan prescribes carbon adsorption as the methodology to be used to treat the extracted vapors whereas the methodology should be based on performance standards. 4B

   d. Use of SVE may require a license as it is a patented technology. 4E

   e. Air sparging, dual vacuum extraction and steam injection are technologies which have been developed to enhance the effectiveness of SVE and should be evaluated. 4B

2. Unaddressed Areas of Contamination:

   a. Deep soil contamination behind Golden State Market should be remediated. Other off-site deep soils have not been adequately investigated. 17

   b. Areas where surface soils are contaminated should be remediated. 17

   c. The Feasibility Study shows that SVE is not contemplated for the area of the facility where the buildings and tanks were located (the "front yard"). Contaminated portions of this area should be addressed. 4C

3. RCRA Equivalent Cap Design:

   a. Under the plan, the removal of SVE 58 wells will necessitate excessive repairs to the cap if the final cap is installed immediately. 7B

   b. There is a lack of definition for the final and/or interim cap configuration. 2A

   c. The plan calls for the unnecessary construction of separate collected gas treatment facility. 3B

4. Slurry Wall:

   a. The slurry wall, if installed immediately, will inhibit remediation of off-site contamination. 17

   b. The plan calls for the unnecessary off-site disposal of excavated material. 1C

   c. Excessive air emissions may be generated during slurry wall excavations. 1C

5. The canal should be relocated to the edge of the facility. 9B

The above concerns are explained in detail below.

I. SOIL VAPOR EXTRACTION

A. Introduction

EPA's preferred alternative for soil cleanup includes

soil vapor extraction for soils at 14-40 feet. The portion of the proposed plan which describes the soil extraction system is reproduced below:

Soil Vapor Extraction (Figure 2) is a process in which organic contaminants are evaporated (volatilized) from the soil, using a series of on-site air injection wells and extraction wells. The extracted VOCs are then treated by carbon adsorption prior to discharge to the air. Carbon adsorption is a treatment system where the volatilized contaminants are forced through tanks containing activated carbon, a specially treated material that attracts the contaminants. The contaminants cling to the carbon, and the air leaving the system is able to meet air quality standards.

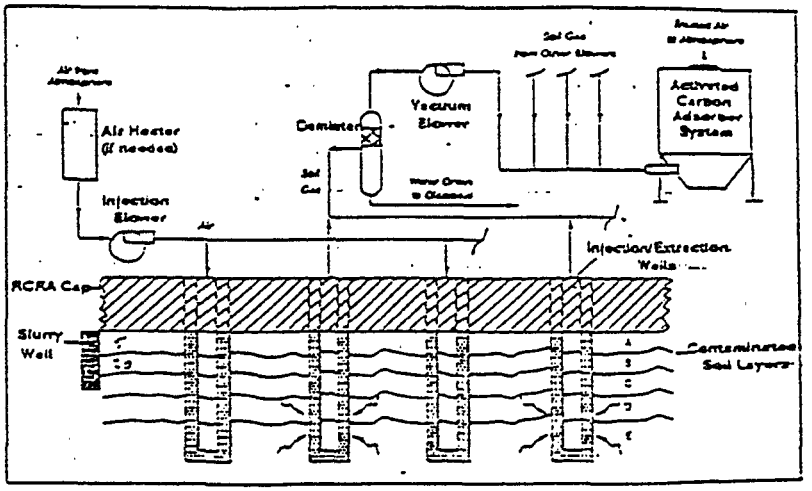


Figure 2: SOIL VAPOR EXTRACTION SYSTEM

B. Standards for Remediation

The May 1992 "Soil Solidification Feasibility and Cost Evaluation" includes a description of soil vapor extraction as it may apply to the Purity site. It estimates that layers C,D and E of the site contain 24,387 pounds of VOCs. Based on an estimated VOC extraction rate it is calculated that the system would be operating 46 months to remove VOCs from soil layers C, D, and E.

Additional analysis of the proposed operation period of the soil vapor extraction system is set forth in the May 1992 "Revised Soil Vapor Extraction and Cap Feasibility Study". An increase in operation time of the SVE system, beyond the 46 months estimated above, is calculated based upon the assumption that 25% of the VOCs from layers A and B will be collected in addition to the VOCs from layers C,D, and E. These calculations result in an estimated operation time of the SVE system for 80 months.

The calculations used to estimate the operational period for the SVE system are useful for cost comparison purposes and may give a general indication of the period of time that the SVE system will be in operation. However, the exact amount of VOCs beneath the site, the rate of their

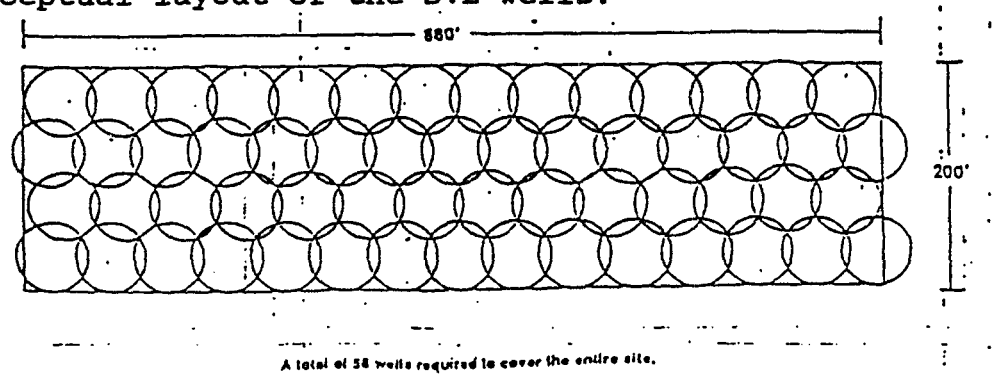
extraction and the amount of VOCs from layers A and B which will be collected are unknowns. Hence, the methodology used to estimate the period of operation is not suitable for determining the point at which the operation of the SVE system should be discontinued and the SVE wells removed. 10A

The 1989 ROD for the cleanup of ground water contamination (Operable Unit #1) states, "Additional cleanup goals based on groundwater protection and constituent solubility will be developed in consultation with the Regional Water Quality Control Board and included in the soils ROD". I have recently spoken with Les Obata with the Fresno Office of the Regional Water Quality Control Board (Mr. Obata has recently taken over the project from Mr. Jim Stites) and he is unaware of any consultations between the regional board and the U.S. Environmental Protection Agency (EPA) on this matter.

EPA should establish cleanup goals for the vadose zone which should be clearly set forth in the Record of Decision. Those cleanup goals should be based upon a demonstration, through soil borings and analysis of contaminant mobility, that remaining VOC levels in the soils pose no threat of degrading the groundwater quality. Under the National Contingency Plan, one of the nine evaluation criteria to be applied to the alternatives is "reduction of toxicity, mobility or volume through treatment" (40 CFR 300.430(e)(9)(iii)(D)). A factor to be considered under this criteria is "the type and quantity of residuals that will remain following treatment..." (40 CFR 300.430(e)(9)(iii)(D)(5)). Thus, the National Contingency Plan requires such an evaluation. 16

C. Number of Wells

The May 1992 "Soil Solidification Feasibility and Cost Evaluation" gives assumptions as to the radius of influence (30 feet), extraction flow rates (40 cfm) and VOC concentration in the extracted gas (60 ppm). The figure below, taken from the Feasibility study, depicts the conceptual layout of the SVE wells.



A total of 58 wells required to cover the entire site.

Approximately 11 miles northwest of the Purity site is the Vendo site where an SVE system was installed. The soils at the Purity site were classified as silt with sand (ML), silty sand (SM), and poorly graded sand (SP). The lithology is similar at the Vendo site consisting mostly of sands and silty sands.

The radius of influence achieved by the test wells installed in the shallow soils at the Vendo site was much greater than the assumption of 30 feet used by EPA for the Purity site. Of course, "radius of influence" is somewhat of a misnomer because the radius of influence is dependent on the amount of vacuum applied to the extraction well and the vacuum level at the observation well considered to be significant. However, at Vendo the effects of applying a vacuum of 10 inches water to an extraction well could be measured in observation wells over 100 feet away. A vacuum of 40 inches water was observable from over 200 feet distant.

Assuming that a radius of influence of 100 feet is obtainable, then the number of extraction wells required is reduced to only 12 to 15 and, under this scenario, off-site contamination would fall under the influence of the system.

The point of the above comparison is to demonstrate that the number of SVE wells required for the site should not be set forth in Record of Decision because the assumptions set forth in the Feasibility Studies as to the SVE wells' radii of influence may be grossly in error. A pilot test is typically performed prior to designing an SVE system and, if the system is complicated, air flow models may be used in conjunction with the pilot test (Curtis, "Pollution Engineering", April 15, 1992 at page 57). Clearly, pilot studies will be required to determine the design parameters for the SVE system. 4B

Ms. Janet Rosati, the EPA RPM for the soils remediation, informed me the EPA has undertaken some type of pilot studies (Meeting on 07/21/92). The results of those studies may provide a basis for determining the number of SVE wells which will required at the site. We should be afforded an opportunity to review those results prior to the issuance of the ROD if EPA intends to include a definitive number of SVE wells in the ROD. 4B

D. Extracted Vapor Treatment

In the same way that the radius of influence for the SVE wells is based upon assumptions that are unsubstantiated with regard to specific site parameters, the selection of the appropriate extracted vapor treatment methodology (given in the proposed plan as carbon adsorption) should be based upon pilot studies which demonstrate the required flow rate and contaminate levels.

The reason for conducting pilot studies in this case is that the removal rates of the VOCs at the site will be less than the removal rates which would be obtained if the constituents were in the form of "free product". The high levels of oil and grease detected in the samples analyzed by Harding and Lawson indicate that the VOCs may, to some extent, be contained in that oil and grease. Raoult's law states that the partial pressure of a volatile component above a liquid mixture is equal to its free product vapor pressure times its mole fraction, i.e., the vapor pressure is reduced (Soil Vapor Extraction Technology, Reference Handbook, February 1991, EPA/540/2-91/003 at page 22). Thus, lowered vapor pressures of the VOCs mixed in the oil and grease fractions may inhibit the effectiveness of the SVE system.

On the other hand, recovery rates may be very high during the early phase of SVE (Ibid at page 211). Carbon adsorption can become prohibitively expensive for high recovery rates (Roy, "Hazmatworld", October 1991 at page 38). If pilot studies and subsequent design parameters indicate that high recovery rates will be achieved, another vapor treatment technique may be warranted. Thermal destruction, catalytic oxidation and/or on-site carbon regeneration are proven technologies that can achieve the same level of vapor treatment with additional advantages over carbon adsorption and subsequent disposal of saturated carbon. EPA should set forth vapor treatment standards in the ROD which are in accordance with the Air District regulations rather than prescribe the use of a particular vapor treatment technology.

E. Possible Patent and Licensing Requirements

A recently article in "Hazmat World", October 1991, indicates that Jim Malot acquired the sole rights to the SVE technique in 1987 (article is included as Attachment "2").

The article indicates that the patents have survived challenges by several companies and that Malot intends to enforce the patents by legal means if necessary.

Before the EPA chooses SVE for remediation of soils at the Purity site, they should first contact the patent holder and receive assurances that he will make the technology available and at what cost. The licensing fee should be considered in EPA's choice of remedies if the fee is excessive.

F. Consideration of Related Technologies

The use of soil vapor extraction is a viable means for extracting the VOCs from the subsurface at the Purity site. However, there are several other related technologies which are available which may provide additional benefits towards removing the contaminants at Purity. EPA should consider the use of the related technologies listed below and the ROD should be flexible enough to allow the implementation of these technologies if warranted. 4B

1. Air Sparging; Seasonal water table fluctuations, drawdown associated with pump-and-treat remediation techniques or disposal involving dense, non-aqueous phase liquids can create contaminated soil below the water table. Vapor extraction alone is not considered to be an optimal remediation technology to address this type of contamination. An innovative approach to saturated zone remediation is the use of sparging (injection) wells to inject air into the saturated zone below the areas of contamination. The contaminants dissolved into the ground water and sorbed onto soil particles partition into the advective air phase and are transported to the vadose zone within the radius of influence of a vapor extraction and vapor treatment system (Marley, et. al., Ground Water Monitoring Review, Spring 1992 at page 137. See also Brown and Jasiulewicz, Pollution Engineering, July 1, 1992 at page 52).

2. Dual Vacuum Extraction and/or Groundwater Depression; Dual vacuum extraction operates in the same way as SVE except that the extraction wells are placed below the water table. The wells feature a pump that withdraws the groundwater to lower the water table and thereby expanding, or deepening, the vadose zone.

This increases the effectiveness of the vacuum extraction by exposing residual contaminants that have collected under the water table (Roy, Hazmat World, November 1991 at page 84).

3. Steam Injection; Steam injection has been successfully used in conjunction with SVE at several sites. (SITE Technology Profile, Udell Technologies, Inc.) The advantages of injecting steam over the injection of air is that the steam will effect a more complete and more rapid removal of contaminants. If pilot studies indicate that adequate contaminant removal by SVE/air injection cannot be accomplished, steam injection may be a viable alternative.

II. UNADDRESSED CONTAMINATION

A. Deep-Soil VOC Contamination

The Remedial Investigation shows that contamination has migrated off-site. Most of the off-site areas where contamination has been detected in the deeper soils do not pose a threat to human health or the environment. However, there are certain areas where the off-site contamination does pose a risk and the Proposed Plan fails to address how those areas will be remediated or contained so as to prevent further degradation of the underlying aquifer.

There are two aspects to the off-site contamination concerns. First, there is off-site contamination of the fairly shallow soils. Off-site shallow soil contamination will be discussed in the next section of this memo. Second, there is off-site contamination of deep soils. In the six off-site borings made, some degree of VOC contamination was discovered. 17

Table 1, below, summarizes the contaminate levels and depths associated with the off-site borings.

Boring and location	Depth (Feet)	Constituents (ug/Kg)	
SBB3 (East of the site, across from the RR tracks)	10	4-Methylphenol	350
		Toluene	9
	20*	4-Methylphenol	350
		Toluene	13
	35	4-Methylphenol	370
SBP3 (Near Northeast corner of the site)	12.5	Toluene	130
	17.5	Toluene	23
	32.5*	TCE	7
		Toluene	10
SBP4 (North of North-central portion of backyard on Bruno's)	13.5*	Toluene	20
		TCE	6
	21.5*	Toluene	14
	36.5*	Chloroform	2
SBP1 (North of North-east corner of front yard behind the market)	10	Chloroform	47
		Ethylbenzene	99
		4Meth2Pentanone	63
		Tetra CE	65
		Toluene	1,100
		TCE	110
		Total Xylenes	140
		Ethylbenzene	99
		1,2-Dichloro-benzene	3,500
	25*	Chloroform	26
		4Meth2Pentanone	51
SBB1 (North of North-east corner of front yard in the trailer park)	15*	4-Methylphenol	400
		Toluene	120
	30*	4-Methylphenol	360
SBB2 (South of front yard in the private residences)	15	4-Methylphenol	420
		Toluene	94
	35	4-Methylphenol	360
		Toluene	16

*Other constituents were detected in several of the borings but were not included in this table because the data was qualified as usable for limited purposes.

TABLE 1: DEEP SOIL CONTAMINATION

The predominant chemicals found were toluene and 4-methylphenol. The properties of these chemicals are described below:

Toluene is a mutagenic substance which also effects the central nervous system. Toluene is derived from coal tar and is sold in commercial grades. The OSHA standard is 200 ppm TWA (in air). It has a vapor pressure of 3.8 kPa at 25 degrees and has a solubility of 515-627 g/cubic meter in water. Toluene is a RCRA listed waste, F005.

4-Methylphenol is also known as p-cresol. Cresol (a mixture of isomeric cresols obtained from coal tar) is corrosive to the skin and mucus membranes. Absorption may result in damage to the kidneys, liver and nervous system. The OSHA standard is 5 ppm (skin) TWA. The recommended standard for occupational exposure is 10 mg/cu. meter. P-Cresol has a vapor pressure of 1 mm at 53 degrees. Cresol is a RCRA listed waste, F004. Cresol is also a contaminant for the toxicity characteristic with a maximum TCLP concentration of 200 mg/l.

The presence of toluene and cresol provides an indication that there may be other chemicals present in the deep soils as the substances for which the soil samples were analyzed was limited. In addition to the two substances mentioned above, the soil samples were analyzed for the following organic substances:

Methylene Chloride	Acetone
1,2-DCA	Chloroform
TCA	Ethylbenzene
Phenol (SBB series only)	Naphthalene
Fluorene (SBB3 only)	Phenanthrene
Anthracene	Benzo(a) Anthracene
Bis(2-Ethyl-hexyl) Phthalate	Chlorobenzene
1,2-Dichloropropane	Di-n-Octylphthalate
TCE	DCE
1,2-Dichlorobenzene (SBP1 only)	
1,4-Dichlorobenzene (SBP1 only)	
1,2,4-Trichlorobenzene (SBP1 Only)	

Contaminants expected to be at the site include used motor oil, solvents, and gasoline. There are many potential contaminants for which an analysis was not performed on the

limited number of samples. Benzene and other isomers of cresol are notably absent from the list of constituents for which the off-site soil samples were analyzed.

It seems clear that the significant levels of cresol would indicate off-site deep soil contamination has taken place. The extent and levels of that contamination are not well defined. Prior to the implementation of a remedy which would not include remediation of the off-site deep soil contamination, a further and more complete analysis should be performed followed by a demonstration that the contaminant levels do not pose a threat of further degradation of the groundwater. 17

There is an exception to the above. In the area behind the market (see Table 1, above, boring number SBP1) the contamination was much greater than for the other off-site borings. Several figures in the Remedial Investigation also depict Pond 1 as extending off of the site and into that area. The deep soils in this area should be remediated.

B. Off-Site Surface and Shallow Soil Contamination

A sample of surface soils off-site on the western edge of the site showed a lead level of 6,400 ppm (sample number HLA143). Other off-site surface samples also show elevated lead levels (samples SS23, SS05, SS06 and HLA163). Contamination in samples taken from a shallow off-site boring in two of the areas showing surface contamination indicate that the contamination extends to some depth below the surface. Samples taken to 3.5 feet deep on the western edge of the site showed high levels of organics and lead (sample location ABP13). Samples from off-site shallow borings behind the market contained high levels of organics and inorganics (sample locations ABP10, SBP1). Efforts should be made to remove these soils for on-site disposal and further verification to assure that all off-site surface soils do not pose a hazard to human health and the environment.

C. Front Yard Contamination

The May 1992 "Soil Solidification Feasibility and Cost Evaluation" does not indicate that the SVE system will be included for the front yard area of the site (See Attachment 1). While the limited sampling performed on the eastern side of the front yard may warrant this exclusion, certainly

the sample analysis results for the western-central portion of the front yard does not (sample SB13). The SVE system should extend to some distance into the front yard as determined by sampling results. 4C

III. RCRA EQUIVALENT CAP DESIGN

A. Effects of Multiple Wells Through the Cap

Upon completion of SVE phase of the remediation, the wells will be removed and the holes left in the cap will have to be repaired. It is known that one of the primary causes of cap failure is due to failure of seams in the flexible membrane liner ("FML") (EPA Memorandum, Office of Solid Waste and Emergency Response dated July 13, 1989). The continuous placement of the clay layer of the cap in successive lifts is also important to prevent direct pathways through the clay barrier layer (EPA/600/S2-91/008, Project Summary, "Factors Controlling Minimum Soil Liner Thickness"). The emplacement of numerous wells through the cap for the SVE and groundwater extraction wells will necessarily increase the number of seams in the FML and present more direct pathways through the clay layer in comparison to a continuous cap without such holes. 7B

A better course of action would be to install a temporary cap to prevent the infiltration of water into the wastes and insure the proper operation of the SVE system. Then, following the completion of the remediation, the final cap should be installed. The deleterious effects on the cap caused by settlement due to VOC and groundwater removal under the site would also be minimized by following this course of action.

B. Type of Materials and Configuration of the Cap

The Proposed Plan includes a diagram of the "RCRA equivalent cap". The figure does not contain specifications as the thicknesses of the various layers and materials. The May 1992 "Revised Soil Vapor Extraction and Cap Feasibility Study" contains some specifications but the thickness of the HPDE layer is not stated. At a minimum, the cap should conform to the requirements of the EPA guidance document entitled "Final Covers on Hazardous Waste Landfills and Surface Impoundments" dated July 1989 (EPA/530-SW-89-047). 2A

C. Gas Collection System

The operation of the SVE system should reduce the amount of gases generated beneath the temporary cap and, at any rate, those gasses should be collected and treated along with the extracted vapors. The treatment of the gas collected in the permanent cap's gas collection system could be done in the system constructed to treat gasses removed via the SVE system and therefore no dual treatment system would be needed. 3B

IV. SLURRY WALL

A. Effects on Remediation of Off-Site Soils 1D

The construction of the slurry wall prior to the operation of the SVE system will inhibit the ability of the SVE system to remove VOCs from off-site soils. In addition, the operation of the SVE system may remove many of the VOCs which would otherwise be released to the air during the construction of the slurry wall. Thus, like the permanent cap, it would be preferable to install the slurry wall following the termination of the operation of the SVE system.

B. Depth of the Slurry Wall

EPA should provide justification for the selected depth of 25 feet for the slurry wall. The May 1992 "Revised Soil Vapor Extraction and Cap Feasibility Study" states that rubble encountered during the excavations for the slurry wall would be hauled off-site for disposal in a RCRA landfill. The rubble encountered during excavations for the slurry wall should be disposed of on-site as off-site disposal is unnecessary. Additional on-site disposal capacity will be gained by relocation of the canal (see discussion below). 1A 1C

C. Air Emissions During Excavations

Air emissions should be monitored on a real time basis. Dust and organic vapor levels which present a risk to human health, either to nearby residents or on-site workers, should be determined prior to the initiation of construction activities. 1C

V. RELOCATION OF THE CANAL

The present location of the canal would place it

underneath the proposed cap in the southeastern corner of the facility. That location presents obvious difficulties with canal maintenance. The canal should be relocated as far to the southern and western edge of the site as possible. If this is done, removal of canal sediments may not be necessary, additional capacity for slurry wall trench spoils will be gained and less excavation into the waste material for the emplacement of the retaining wall will be needed. Also, the cap need not extend over the canal so that the canal maintenance involving excavation of the canal can be more easily performed. 9B

Duncan Austin
Waste Management Engineer

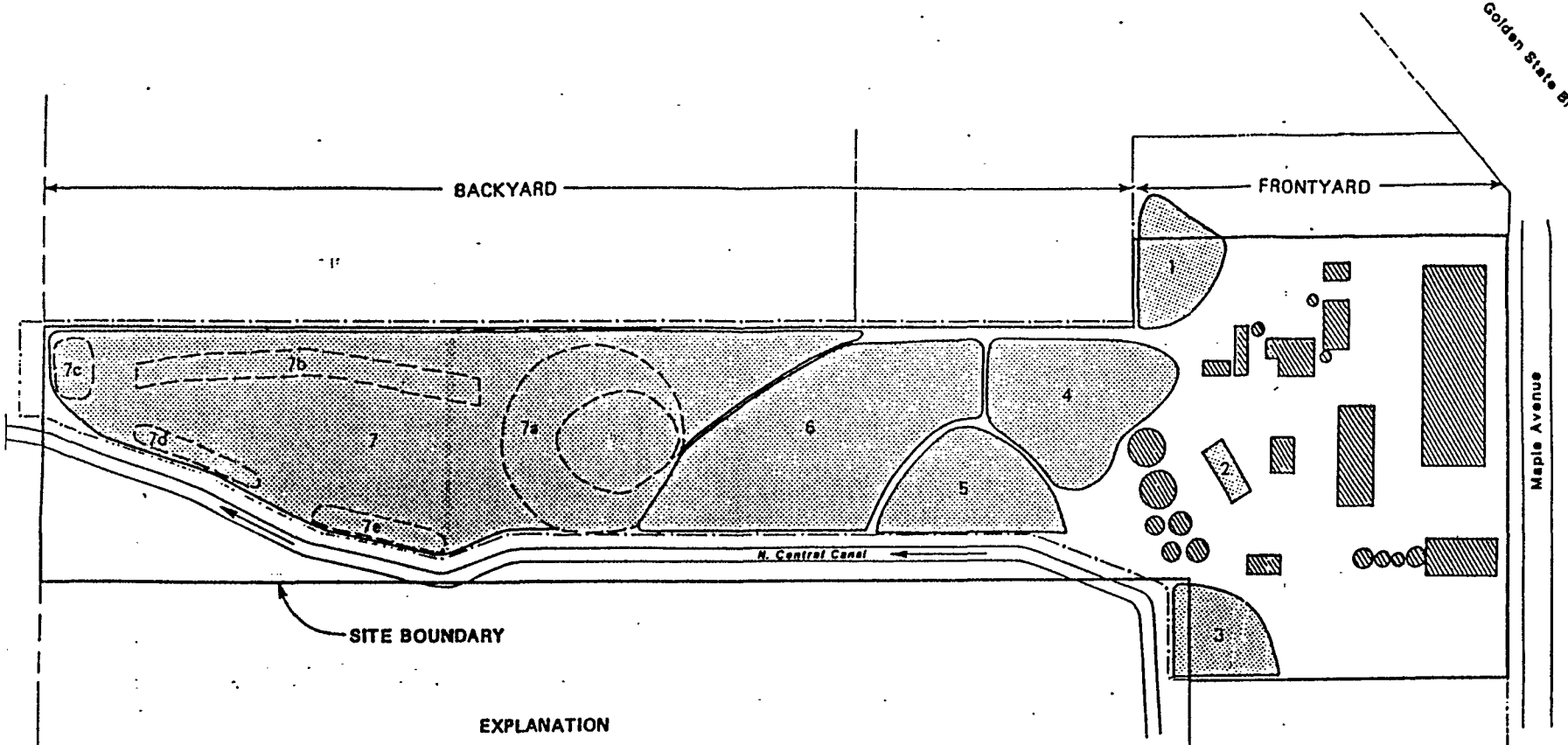


FIGURE 1-3

APPROXIMATE FACILITIES LAYOUT

REMEDIAL INVESTIGATION REPORT
PURITY OIL SALES SITE
FRESNO, CALIFORNIA

Vacuum extraction provides in situ cleanup of organics-contaminated soil

By Kimberly A. Roy

If only removing contaminants from soil were as easy as removing dirt from a carpet. For some sites, this wishful thinking has been translated — loosely — into reality with an innovative technology known as vacuum extraction.

Vacuum extraction was baptized under fire at a Superfund site in Puerto Rico. It was developed there by Jim Malot, a consultant, and Melvin Visser, an engineer with Upjohn Co. (Kalamazoo, Mich.), which owned the site and initiated cleanup in response to USTs leaking carbon tetrachloride. The site contained about 1 million cubic yards of contaminated soil, including clay and fractured rock, Malot recalls. When the contamination was discovered, he continues, EPA proposed excavating the site or flushing the solvent from the clay soil into the aquifer. However, neither option sounded promising to Upjohn, and Malot and Visser in 1982 began developing the concept of vacuum extraction.

Once developed, the technology originally met resistance from EPA, whose officials doubted it would work, Malot says. However, the Agency finally was persuaded to give it a chance, and the first extraction well was installed in January 1983. When fully operational, the system removed 250 pounds per day of carbon tetrachloride, and the soil was declared clean in 1987. After vacuum extraction's successful debut in Puerto Rico and at more than 50 other sites around the United States, attitudes about the technology "changed 180 degrees," Malot says, and it joined the market as an innovative cleanup technique.

Malot acquired sole rights to the technique in 1987, when Upjohn decided the technology did not fit well with its primary business — pharmaceuticals. Today, he holds two process patents on vacuum extraction covering the basic concept whereby volatiles are recovered from the vadose, or unsaturated, zone, which lies between the ground's surface and water table. Several companies challenged the original patents, but a detailed review by the U.S. Patent Office eventually upheld the original claims in their entirety, Malot relates.

Since then, the technology has been through "the normal evaluation process," Malot says, including a 3½-year stint in EPA's Superfund Innovative Technology Evaluation (SITE) program. Vacuum extraction entered the program as a technology offered by Terra Vac Inc. (San Juan, Puerto Rico), the technology's first licensee. As part of the SITE program, vacuum extraction was demonstrated at the Valley Manufactured Products Co. Inc. site in Groveland, Mass. The area, which was contaminated primarily by trichloroethylene, is part of the Groveland Wells Superfund site.

A vacuum system induces air flow through the vadose zone, stripping and volatilizing VOCs from the soil into the air stream.

During the eight-week test run, 1,300 pounds of volatile organic carbons (VOCs) were extracted. Results showed "a steady decline in the VOC recovery rate with time, a marked reduction in soil VOC concentration in the test area, and an indication that the process can remove VOCs from clay," according to a May 1989 EPA report.

How it works. A basic system consists of three components — one or more wells installed in the treatment zone; vacuum equipment, which is the driving force behind the process; and a vapor treatment technique. Water extraction equipment also may be required.

Once a contaminated area is characterized, extraction wells are installed. A vacuum system induces air flow through the vadose zone, stripping and volatilizing VOCs from the soil into the air stream. Water usually is extracted along with the contamination. According to an EPA SITE report, the two-phase flow of contaminated air and water flows to a separator, which removes contaminated water. Contaminated air then flows to a vapor treatment system, such as activated carbon or catalytic oxidation.

Soil at the Groveland site varied from medium to very fine silty sands near the surface, to a middle layer of stiff and wet clays, and sand and gravel closer to the groundwater. Contaminant levels ranged from 200 ppm to 1,600 ppm before the demonstration, which involved four wells installed at a depth of 24 feet. Soil porosities ranged between 40 percent and 50 percent, and permeabilities ranged from 10^{-4} centimeters per second (cm/sec) for the sands to 10^{-8} cm/sec for the clay. At the demonstration's conclusion, concentrations ranged from non-detectable to 60 ppm.

According to Malot, who also is president of Terra Vac, the concept of vacuum extraction sounds simpler than it is, depending on a site's specific hydrogeologic conditions. The difficulty is designing, installing and operating a system that considers contaminants, their concentrations and subsurface conditions including soil permeability and porosity, he says. Hydrogeologic conditions and other site-specific factors dictate the size and strength of the vacuum source, while contaminants and local regulations dictate the type of vapor treatment technique. For example, high mass-recovery rates call for catalytic oxidation, while low recovery rates typically favor carbon adsorption.

Choosing a vapor treatment technique is based partially on economics, Malot says. Carbon adsorption becomes prohibitively expensive for high recovery rates, while catalytic oxidation, or low-temperature combustion, is insensitive to them, he explains.

Contaminants also influence selection of a vapor treatment technique. For example, he says, hydrocarbons oxidize more easily than chlorine-containing compounds, although it can be done, as first demonstrated by Terra Vac at a Michigan Superfund site.

Like most technologies, vacuum extraction has limitations; it cannot handle heavy, chlorinated compounds

or hydrocarbons heavier than the mid-diesel range, Malot relates. "It will not recover metals, with the possible exception of mercury, pesticides or heavy organics like fuel oil No. 6," he continues. "Basically, it's limited to contaminants with volatile characteristics," and generally is not applicable to such compounds as dioxin and PCB.

When the technology is applicable to contaminants; it can handle them in the percent levels. "We can get grossly contaminated sites down to 10 ppb or non-detectable," Malot says. Sizing, or scaling, up is not a problem for the technology, which is effective for contamination as shallow as 3 feet and as deep as 300 feet. Costs vary with site conditions but generally run between $10 and $40 per cubic yard. he adds.

The key to successful use of vacuum extraction lies in "getting a clear understanding of subsurface conditions," Malot asserts. "Most often, they're not well defined and typically require more work and some adjustments (during operation), as necessary. It requires a lot of interpolation, interpretation and knowledge of chemical behavior in the subsurface environment."

Third-party opinion. Ciba-Geigy Corp. (Ardsley, N.Y.) chose vacuum extraction to remediate a 5-acre site in Pennsylvania contaminated with percent levels of volatiles and some semivolatiles. Contamination, including trichloropropane, toluene and xylene, reached an average depth of 15 feet and a maximum depth of 20 feet, says project manager Karline Tierney. Before choosing vacuum extraction, company and EPA officials discussed several other options, Tierney recalls, including excavation, capping and draining the site. However, underlying bedrock presented concerns about capping, and the close proximity of a large residential area aroused company concerns about the safety of excavation, she relates.

Vacuum extraction first attracted Tierney's attention at an unrelated PRP meeting, where it was discussed as an alternative, she says. Meanwhile, a company consultant also read about the technique, and the two agreed to explore it further. The vacuum extraction system eventually installed has been operating for 2½ years.

The system has been operating relatively smoothly, but problems associated with the soil's heterogeneity are an ongoing problem, Tierney says. For example, she says, the cleanup crew recently discovered a layer of rock that has caused some interference. "Above the rock, cleanup has been very good, but not as consistent underneath," she explains. The first few months of operation also saw the formation of tar in some of the wells. Heat and decane cleaning have minimized the problem, although the cause has never been determined with certainty because the situation could not be recreated in the lab, she adds.

Besides difficulties defining the site, "our biggest problem has been estimating the initial contamination levels," Tierney says. "It was not possible to identify with any degree of certainty how much there was initially." Extracted vapors show "enormous" reductions, but "we don't know how long it will take to meet the cleanup standards," she concludes. Target cleanup levels under a consent decree with EPA are an average of 50 ppb each for four compounds — trichloropropane, trichloroethylene, perchloroethylene and benzene.

The consent decree originally called for final soil sampling in November 1990, but at that time, "we knew we were not down to those levels, and EPA ... is in the process of amending the consent decree," Tierney says. No specific date had been set at press time. High contaminant concentrations initially precluded use of biodegradation, but the company may use it as a polishing step when the project gets closer to completion, which Tierney says she hopes will come "within a few years."

Although cleanup has been more time consuming and costly than originally anticipated, "we don't regret (our choice) at all of an *in situ* remedy because of the nearby residential area," Tierney says. "We chose Terra Vac because they had by far the most experience cleaning up sites with percent levels of contaminants."

California cleanup. Canonie Environmental Services Corp. (Porter, Ind.), also a licensee, recently used vacuum extraction to remediate about 10,000 cubic yards of contaminated soil at a California site. Contaminants at the site, located in a light commercial area, included perchloroethylene and trichloroethylene in concentrations greater than 630 ppm. Contamination reached a depth of 40 feet, and was beneath and adjacent to the corner of a building.

System design included 16 air extraction wells. Two wells — one shallow and one deep — were installed in each of eight locations, relates Oliver Wesley, vice president of Rocky Mountain Operations (Denver). Wells near the building were drilled at an angle to reach contamination there. Two liquid vacuum pumps provided an air flow rate of 80 square cubic feet per minute at 22 inches of mercury. Vapors were treated with carbon adsorption.

Cleanup levels originally were set at non-detectable based on TCLP analysis but were renegotiated to about 2 ppb, Wesley relates. During 18 months of operation, the system removed more than 14,000 pounds of solvent, he says. The only problem encountered during that time involved contamination at a depth of about 25 feet and required focusing the vacuum in those areas, he adds.

The technology was chosen for the cleanup from several options, including excavation and landfilling, excavation and land farming, excavation and incineration, and volatilization, Wesley recalls. It was chosen primarily because of economics, he adds. "It (vacuum extraction) was about two-thirds the cost of the closest other option," he says, "about $2 million vs. more than $3 million.

"It worked great," Wesley continues. "I think it has real good specific applications, and especially below existing structures, where contamination is not easily accessible."

John Gentry, senior environmental engineer with Post, Buckley, Schuh & Jernigan (Orlando, Fla.) and former administrator of the Florida Department of Environmental Regulation's Office of Technical Support, agrees. "I haven't seen a cost comparison, but my sense is that vacuum extraction is very cost competitive for sites where it would work," he says. Besides cost savings, he adds, vacuum extraction offers another important benefit — it allows such sites as gas stations to continue operating during cleanup, which would not be possible with excavation.

"I like the technology very much," Gentry says. "I'm very impressed and surprised it's not used more. That mystifies me. A lot of people don't want to spend a little more to do the necessary assessment work on the front end, but that's false economics. The bottom line in cleanups is killing the source of contamination. If you don't kill the source, you'll be out there forever trying to clean up groundwater. Killing the source is what vacuum extraction does very well."

Despite Gentry's assertions that vacuum extraction is being underused, it has been cited more than any other innovative technology as a remedy at Superfund sites, according to a report released in January by the EPA Office

of Solid Waste and Emergency Response Technology Innovation Office. According to the report, innovative technologies have been identified in 37 percent of all records of decision (RODs), and vacuum extraction techniques account for 12 percent of those. Of a total of 31 vacuum extraction projects, one has been completed, five are being installed or are operating, and 25 are in the pre-design or design stage, the report says.

"I think it has basically been accepted as a viable, demonstrated technology by EPA and most state organizations," Malot concludes.

Of a total of 31 vacuum extraction projects, one has been completed, five are being installed or are operating, and 25 are in the pre-design or design stage.

Strategies. Besides Terra Vac and Canonie, licensees include CH_2M Hill (Englewood, Colo.) and DOE's Savannah River Plant site (Aiken, S.C.). Malot's biggest problem, however, has not been industry acceptance but companies infringing on his patents.

Although he concedes he does not know how widespread the problem has become, Malot says he intends to protect his interests. "My approach all along ... is to make a license available to everybody who wants one. However, there comes a time when it becomes obvious that some people are choosing to infringe rather than take a license, and I'm obligated to do something about it."

Last year, Malot filed suit against Roy F. Weston Inc. (West Chester, Pa.), based on preliminary information that the company was using the technology without a license, he relates. The suit in June was withdrawn without prejudice to later re-instatement, when Malot and Weston agreed to make "a serious effort" to negotiate a licensing agreement rather than pursue litigation. An agreement had not been reached at press time, but negotiations were continuing. However, "I intend to enforce my patents and ... will take the legal route (against others in the future) if necessary," Malot concludes. ▼

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CLIENT 1478001

July 10, 1992

Janet Rosati
United States EPA, Region IX (H-6-1)
75 Hawthorne Street
San Francisco, California 94105

Re: Purity Oil Sales Superfund Site

Dear Ms. Rosati:

This letter is written on behalf of the County of Fresno ("County") as a comment on the draft proposed plan for soil remediation. Initially, we respectfully request an extension of the public comment period for thirty (30) days. The reason for this request is that the County did not receive the draft proposed plan or supporting documentation in sufficient time to allow for a meaningful analysis and review. Because the site is located within its jurisdiction, it is vital that the County have a full opportunity to consider the short-range and long term impacts of the proposal. That opportunity has not been provided.

The County also lodges a general objection to the draft proposed plan to the extent that it is inconsistent with County Ordinances or State law. The County's overriding consideration in this matter is public health and safety. That interest is served only if contamination is remedied, removed, or permanently confined to the site.

Beyond those general objections and concerns, the County has the following specific comments:

1. The EPA should address the possible lining or enclosure of the canal adjacent to the site. The County is concerned with water contamination if the canal is not lined or enclosed. 9B

2. The EPA should address the treatment of soil below 40 feet to the existing or potential water table. The County is concerned as to whether the proposed Soil Vapor Extraction System ("SVE") adequately provides for the long-term treatment of that soil layer. 4B

3. The EPA should consider whether the slurry wall is appropriate. It appears that the wall will extend beyond the site limits to adjacent property. The County would like some assurance that the proposed slurry and that the proposed SVE system will in fact result in removal of contaminants from layers A and B. The County is concerned that in the long run the SVE system proposed will not achieve significant removal from those layers. 1A 4D

4. The County questions the necessity of a RCRA cap. It appears that a lesser cap will perform as well or better, at a much reduced cost. Further, any future need to remove or treat contaminants would be much more expensive with a RCRA cap in place. 2A

These comments are preliminary because of the limited time for review. The County reserves the right to modify or add to these comments. The County again urges the EPA to extend the time for public comment and allow an adequate opportunity for meaningful review.

Very truly yours,

SINSHEIMER, SCHIEBELHUT & BAGGETT

THOMAS D. GREEN
For the County of Fresno

TDG/tlg
gBLEV710.ltr

cc: Tim Casagrande

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CLIENT 1478001

August 10, 1992

Janet Rosati
United States EPA, Region IX (H-6-1)
75 Hawthorne Street
San Francisco, California 94106

Re: Purity Oil Sales Superfund Site

Dear Ms. Rosati:

This letter represents further comments of the County of Fresno to proposed Operable Unit #2 on the Purity Oil Sales Superfund Site located in Malaga, California. These comments are intended to supplement (and when inconsistent supercede) the County's comments contained in our letter to you of July 10, 1992. The County reserves the right to modify or supplement these comments upon further investigation or analysis.

1. Based on available hydraulic modeling work, it appears the canal exerts no hydraulic influence on the Site or the plume. The need for piping the canal based on other remedial design impacts to the canal structure should be evaluated. A slurry wall adjacent to the canal might provide a barrier to potential hydraulic influences. 9A & 9B

2. A 24-foot slurry wall across the entire site appears excessive. The dimensions of the wall should be site specific and based upon relationship to contaminated soil. Areas below 14 feet where the proposed Soil Vapor Extraction (SVE) system would be operating, around the perimeter of the "front yard" area and in areas where there are sufficient non-contaminated zones, such that movement of contamination would not leave the Site, should not undergo installation of the slurry wall. 1A

3. A RCRA cap over the entire area is unnecessary. As proposed, the stability of the cap requires an eight-foot high two-feet tick retaining wall. A thinner cap with HDPE liner, one-foot reinforced concrete, and one foot of vegetation would reduce infiltration, control potential migration, prevent access to site materials and reduce or eliminate the need for a retaining wall. Also, 2A & 3A

the cap should be targeted to areas of contamination, such as, the disposal pits. This could save considerable costs while providing adequate protection of the Site.

4. There should be a pilot study conducted on the contaminated vadose zones to properly locate and design a Soil Vapor Extraction system. Modifications to the proposed SVE system may need to occur based upon slurry wall installation requirements around the entire Site. 4B

The County appreciates the extended opportunity provided for public comment and welcomes any questions regarding its position on the proposed remediation.

Very truly yours,

SINSHEIMER, SCHIEBELHUT & BAGGETT

Thomas D. Green/tlg

THOMAS D. GREEN
For the County of Fresno

TDG/tlg
gROSA710.ltr

cc: Phillip S. Cronin, Esq.
Tim Casagrande

Pacific Gas and Electric Company

Environmental Services
P.O. Box 7640
San Francisco, CA 94120
415/973-7000
Direct Dial 415/973-
Telecopy 415/973-3201

August 10, 1992

Ms. Janet Rosati
Remedial Project Manager
United States Environmental Protection Agency
Region IX
75 Hawthorne Street (H-6-1)
San Francisco, California 94105

Dear Ms. Rosati:

RE: Purity Oil Sales Site, Proposed Operational Unit No. 2 (OU2) Soil Clean-up Plan

Thank you for extending the comment period for the proposed Purity Oil Sales Site OU2 soil clean-up plan from July 10, 1992 to August 10, 1992. We appreciate the extra time to fully evaluate available pertinent information and prepare our comments, summarized in Attachment 1, for your consideration and response.

Although PG&E is a member of the Purity Oil Sales Site Steering Committee and Technical Committee (established to address OU1), PG&E has elected to supplement comments prepared by the committees regarding the OU2 soil clean-up plan as proposed by the United States Environmental Protection Agency (U.S. EPA). Our comments address an underlying concern regarding the technical and managerial direction that the Purity Oil Sales Site project is taking.

PG&E has an interest in working closely and cooperatively with regulatory agencies in addressing environmental projects such as the subject site. If you have any questions regarding the attached comments, please contact me at 973-7694. Thank you for your cooperation.

Sincerely,

Patricia L. Nelson

Patricia L. Nelson
Environmental Specialist

Attachments

cc: Mr. Martin Hausladen
U.S. EPA - Region IX

Matthew Strasberg, Esq.
U.S. EPA - Region IX

Mr. Duncan Austin
California EPA - Department of Toxic Substances Control

ATTACHMENT 1

PG&E Comments of the U.S. EPA-Proposed Purity Oil Sales Site Operational Unit No. 2 (OU2) Soil Clean-up Plan

Managerial Concerns

1) The proposed soil clean-up plan indicated that the "carcinogenic risk associated with the site was determined by the U.S. EPA (EPA) to be within or below the acceptable risk range of 1 in 10,000 to 1 in 1,000,000". In addition, the Hazard Indices (HI) calculated for soils within the first foot of ground surface was greater than 1, defined to be a potentially unacceptable non-carcinogenic health risk; soils below 1 foot of the surface were determined to have HI values of less than one, which represent an acceptable non-carcinogenic health risk.

   Based on the EPA risk assessment it appears the site does not pose an imminent risk to human health or the environment. Because the site does not pose an imminent health or environmental risk is the EPA willing to consider reversing the order of the OU1 (ground water) and OU2 (soil) clean-ups? If not, can the EPA consider coordinating the timing of the OU1 and OU2 clean-ups to minimize the impact of their respective incompatibilities (defined further under "Technical Concerns")? By doing either or both it appears that certain of the ground water and soil clean-up technologies would operate in an orchestrated fashion rather than a competing fashion. For example, the use of a soil vapor extraction system (SVE) requires wells be placed through an engineered cap. Such an infrastructure which penetrates the cap surface may limit the effectiveness of the cap because infiltration is not prevented at the well heads. 13A 13B 7B

2) A reduction of volatile organic compound (VOC) concentrations in soils by employment of the SVE constitutes a source treatment. Source treatments often reduce or preclude the need for elaborate ground water treatment systems. To PG&E's knowledge the EPA has not defined the relationship between the chemicals found in on-site soil and in ground water. Would EPA consider performance of additional field studies to determine the relationship between chemical sources in soil and ground water prior to the final design of the OU2 and OU1 clean-up plans? 13C

3) The southeast corner of the U.S. EPA-defined site comprises approximately 0.5 acres and is known as Assessor's Parcel Number (APN) 330-06-05. The owner of 15

PG&E Comments of the U.S. EPA-Proposed Purity Oil Sales Site Operational Unit No. 2 (OU2) Soil Clean-up Plan

Managerial Concerns (continued)

record to APN 330-06-05 is the Fresno Recycling Company (refer to Exhibit 1). To PG&E's knowledge, the owner of APN 330-06-05 has not been identified as a potential responsible party (PRP) for the Purity Oil Sales Site Please explain how the property owner of a portion of a federal Superfund site may has been apparently omitted from the list of PRPs responsible for carrying out the proposed treatment plans. 15

Technical Concerns

1) The EPA estimated the mass of highly leachable organic waste and reported the results in the Public Comment Feasibility Report, April 1989. In that report, the EPA estimated the mass of leachable volatile organic compounds (VOC) in Layers A and B to be 454 pounds, and in Layer C as 25 pounds for a total of 479 pounds. According to the Revised Soil Vapor Extraction and Cap Feasibility Study, May 1992, there is an estimated VOC mass in Layers A and B of approximately 71,801 pounds and an estimated VOC mass in Layers C, D, and E of 24,387 pounds. Please provide the basis for and calculations which led to the estimates of VOC mass in each of the layers and an evaluation of the accuracy of the estimates. 12C

2) The Revised Soil Solidification Feasibility and Cost Evaluation, May 1992 reports the results of EPA's revised VOC mass estimate. The estimate is reportedly based on soil sample results reported in the Supplemental Remedial Investigation Report, October 1988, and the Final Supplemental Report - Soil and Groundwater Sampling, August 1990, for Layer C samples (samples at 12 to 20 feet below ground surface). We understand an average VOC concentration in soils in Layer C was derived from the analytical data for soils (summarized in Table 1 in Exhibit 2) and was determined to be 134 parts per million (ppm, Table 2-4 in Exhibit 2). 12B 12C

   a) The highest concentration of VOC in Layer C was from Soil Boring No. SB13-02 with a total VOC of 127 ppm. Please explain the how the average concentration of VOC was determined to be 134 ppm.

   b) An average VOC concentration of 134 ppm does not

PG&E Comments of the U.S. EPA-Proposed Purity Oil Sales Site Operational Unit No. 2 (OU2) Soil Clean-up Plan

Technical Concerns (continued)

appear to be supported by the compilation of soil sample results summarized in Table 1 (which were reported in the Supplemental Remedial Investigation Report, October 1988, and the Final Supplemental Report - Soil and Groundwater Sampling, August 1990). Please comment on whether EPA believes that such contradictions in data supports the development of a SVE system to treat site soils. 4F

3) According to the Remedial Investigation Report, the locations of soil borings were selected for the purpose of investigating known or suspected areas where concentrations of site residues could be the highest. The non-randomness of the soil boring locations (as well as sample depth) can prejudice the estimated average concentrations of residues. According to the Feasibility Study Report the proposed layout of SVE wells covers the entire site area including locations where non-detectable concentrations of residues were observed. Please explain the rationale behind the assumptions for deriving the average concentrations of VOC to be treated by the SVE and establishing the proposed locations of the SVE wells. 4B 12A 12B

4) The SVE has been proposed because its intent is to recover VOCs and by doing so protect ground water. Leachibility studies performed by the EPA, as summarized in the Public Comment Feasibility Report, 1989, determined that following the installation of the cap, migration of VOC to ground water would not be significant. Therefore, the SVE appears to provide no additional protection to ground water beyond that provided by the cap. The presence of the SVE (e.g., its penetration through the cap creating potential conduits for migration of contaminants to ground water) may compromise the cap's effectiveness. Please explain the usefulness of and financial justification for the SVE in reducing the potential risks to human health and environment that the site may pose. 4A

5) We understand from the Feasibility Study, as revised, that the vacuum pressure of the SVE has been proposed to be six inches of mercury. This pressure may result in a rise in the elevation of the ground water table by up to seven feet. A rising ground water table could dissolve site residues and negatively affect the design and operation of the OU1 clean-up system. Please 7C

PG&E Comments of the U.S. EPA-Proposed Purity Oil Sales Site Operational Unit No. 2 (OU2) Soil Clean-up Plan

Technical Concerns (continued)

provide an explanation of the compatibility of the SVE treatment for OU2 and its potential impact on the proposed treatment for OU1 for ground water.

6) The SVE references cited by the EPA in the Soil Solidification Feasibility Study, May 1992, report a rapid attenuation of VOC in extracted air indicating mass recovery rates are not constant. Please explain the effect of a rapid drop in mass recovery rate on the estimated clean-up time and cost. 11B

7) The SVE is a licensed technology. Please explain whether the licensing costs are included in the cost estimate. 11C

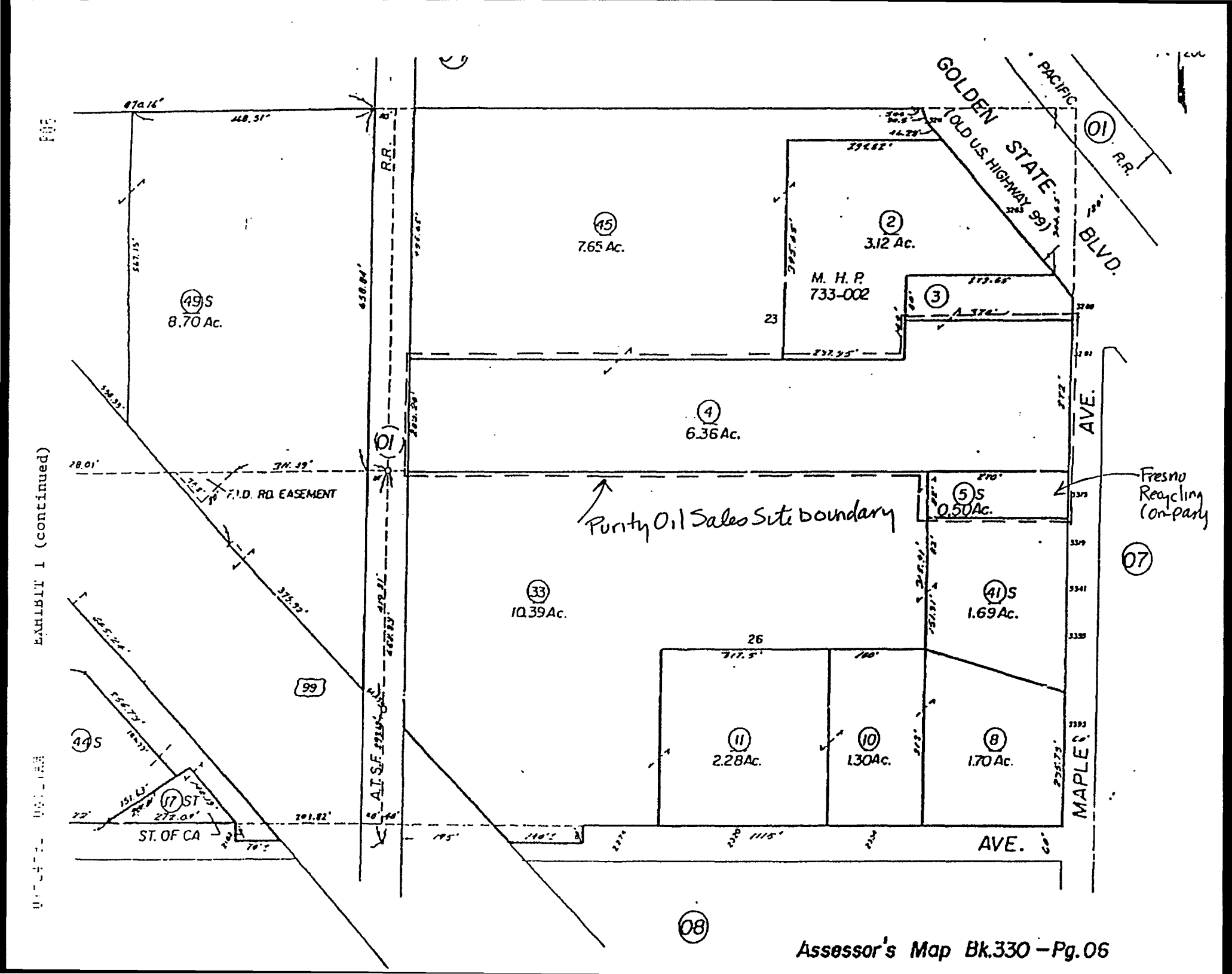
8) The preferred alternative identifies installation of a 25 foot "hanging (not keyed to stable underlying geological formations)" slurry wall. The apparent purpose of the slurry wall to a depth of 25 feet below surface grade is to form a lateral barrier within subsurface soils and "further minimize the leaching of contaminants to ground water". Because the slurry wall is not a barrier to vertical migration of ground water and is not designed to intersect, or contain, the lateral migration of ground water (which occurs approximately 45 to 50 feet below surface grade), please explain how the slurry wall will "further minimize the leaching of contaminants to ground water" more effectively than the proposed cap. 1A

PARCEL LIST — FRESNO — 1991-92 — PAGE 7,261

PARCEL NO. / TRA	OWNER / ADDRESS (*-MAIL, #-PROP LOC, =-SAME) / PROPERTY DESCRIPTION	ZIP	DOCUMENT DATE / NO. / SALE DATE / AMOUNT	ASSESSED VALUES /TAXES	LOT SIZE / IMP SIZE
330 050 04 950110	WINNETT HERBERT L & CARTHEL L = 3085 S CHESTNUT, FRESNO CA -- COMMERCIAL MISCELLANEOUS --	93725	USE-CS01000	14,209 LND 22,392 IMP 7,000-HO 29,601 NET 334.44 /90	
330 050 05 950110	PENNER DENNIS RAY & BRENDA * 10270 LANES BRIDGE, MADERA CA # 3111 S CHESTNUT, FRESNO -- INDUSTRIAL MISCELLANEOUS --	93638	11/28/90 145874 05/90 100,100 USE-IS02000	127,500 LND 15,300 IMP 142,800 NET 1,471.36 /90	950 3-GARAGE EFF 1940
330 050 06 950110	LANINGHAM FLORENE P BROSWELL LINDA V * 2374 NORTHHILL DR, SELMA CA # 3161 S CHESTNUT, FRESNO -- COMMERCIAL MISCELLANEOUS --	93662	11/21/85 119114 USE-CS01000	5,115 LND 14,209 IMP 19,324 NET 213.12 /90	1,400 EFF 1930
330 050 23 S 950110	PRODUCERS COTTON OIL COMPANY * P O BOX 1832, FRESNO CA # 2611 E NORTH, FRESNO -- WAREHOUSES/TRUCK TERMINALS --	93717	2/01/84 999999 USE-IWAHS03	472,237 LND 106,120 IMP 1,323,400 T/F 523,400 P/P 2,425,157 NET 23,768.58 /90	16,256 EFF 1960
330 060 02 950180	GOBLE ERNEST L JR & PATRICIA D'AUN * 1650 ZANKER RD SUITE 100, SAN JOSE CA # 3265 S GOLDEN STATE BL, FRESNO -- MOTELS --	95112	2/28/84 19032 02/84 37,000 S USE-CMHPA11	155,071 LND 292,913 IMP 600 P/P 448,584 NET 4,766.48 /90	933 EFF 1930
330 060 03 950180	LAUER ALLAN ROY & MADGE ANN * P O BOX 10157, FRESNO CA # 3269 S GOLDEN STATE BL, FRESNO -- COMMERCIAL STORES --	93745	8/09/82 65749 08/82 160,000 S USE-CCS1S01	36,319 LND 121,850 IMP 158,169 NET 1,679.42 /90	3,000 EFF 1960
330 060 04 950180	PURITY OIL SALES INCORPORATED * 873 81ST AVENUE, OAKLAND CA # 3281 S MAPLE, FRESNO -- MINERAL RIGHTS --	94621	10/09/84 100918 USE-IMIR000	400 LND 400-OTH 0 NET 120.00 /90	
330 060 05 S 950180	FRESNO RECYCLING COMPANY * C/O PICK-A-PART AUTO WRECKIN, 2274 E MUSCAT, * FRESNO CA # 3315 S MAPLE, FRESNO -- COMMERCIAL VACANT --	93725	USE-C000000	16,317 LND 191.18 /90	
330 060 08 950180	SMITH KENNETH D & SHARLYN H * 4861 E NORWICH, FRESNO CA # 3393 S MAPLE, FRESNO -- COMMERCIAL MISCELLANEOUS --	93726	04/91 135,000 USE-CXXXS01	28,248 LND 3,133 IMP 34,760 T/F 55,550 P/P 121,691 NET 1,014.28 /90	720 EFF 1920
330 060 10 950180	NEU RICHARD W & PATSY MC ELROY GLEN C & EULA PEARL ET AL * 2274 E MUSCAT AVE, FRESNO CA # 2334 E MUSCAT, FRESNO -- COMMERCIAL VACANT --	93725	9/11/84 87290 09/84 90,000 S USE-C000VLM	89,435 LND 41,163 IMP 130,598 NET 1,390.16 /90	

Parcels comprising Purity Oil Sales Site

EXHIBIT 1



Assessor's Map Bk.330 – Pg.06

TABLE 1

C-LAYER SOIL SAMPLE DATA FOR SELECTED VOLATILE ORGANICS

PURITY OIL SALES SITE

(all values in parts-per-million)

SAMPLE	LOCATION	DEPTH	BENZENE	TOLUENE	ETHYL-BENZENE	XYLENE	CHLORO-BENZENE	TCE	2-BUTANONE
SB2-05	2 to 3	15-16.5	NA	0.23	<0.01	NA	<0.01	0.01	<0.01
SB13-02	8 to 9	12-13.5	<0.75	1.8	2.2	120	<0.75	0.01	<1.5J
SB14-01	8 to 9	17-18.5	<0.005	0.002J	<0.005	NA	<0.005	<0.01	0.003J
SBB1-03	0 to 1	15-16.5	NA	0.12	<0.01	NA	<0.01	0.01	<0.013
SBB2-03	2 to 3	15-16.5	NA	0.094	<0.01	NA	<0.01	0.01	<0.014
SBP2-06	6 to 7	15-16.5	<0.019	0.33	0.046	0.05	<0.019	<0.01	<0.039J
SBP3-02	0 to 1	12.5-14	NA	0.13	<0.01	NA	<0.01	<0.01	<0.013
SBP3-03	0 to 1	17.5-19	NA	0.023	<0.01	NA	<0.01	<0.01	<0.012
SBP4-04	4 to 5	13.5-14.5	NA	0.02	<0.01	NA	<0.01	0.01	0.028J
SBP6-06	8 to 9	15-16.5	<0.026	<0.026	<0.026	<0.026	<0.026	<0.01	<0.051
B2-10	7 to 8	15-16.5	NA	0.21	0.19	NA	<0.01	XD	NA
B23-08	8 to 9	12.5-14	0.04	2.8	2	NA	XD	0.48	NA
SB-15	8 to 9	12-13.5	ND	ND	ND	16	ND	ND	ND
SB-15	8 to 9	18-19.5	ND	2.3J	1.2J	8J	ND	ND	ND
SB-16	4 to 5	12-13.5	ND	ND	ND	ND	ND	ND	ND
SB-16	4 to 5	15-16.5	ND	0.043	ND	ND	ND	ND	ND
SB-17	2 to 3	13-14.5	ND	0.004J	ND	ND	ND	ND	ND
SB-17	2 to 3	16-17.5	ND	1.1J	ND	ND	ND	ND	ND
C-Layer	Composite Sample		ND	ND	ND	ND	ND	ND	ND

ND-Denotes compound non-detected in sample; J- Flag for QA/QC problems for sample.
Location referes to site cross-sections from Figure 3-4 of Remedial Investigation Report.
C-Layer includes all soil samples from 12 to 20 feet below ground surface.

EXHIBIT 2

SVE systems can be operated in areas with or without a cap system and with or without adjacent wells for air injection. The waste pit portion of the Purity Oil Sales site will be covered with a soil and clay cap system. The cap system and intervening layers of solidified material will certainly create a large amount of resistance to pulling air into the wells from the surface. Therefore, it will be necessary to install injection wells, strategically placed between the extraction wells, to maintain the flow of air through the contaminated layers.

Quantity & Type of Contaminants. As stated above in Section 2.3, "Thermal Stripper and Material Handling," the soil sampling results presented in the "Remedial Investigation Report"[3] and "Final Supplemental Report"[7] for the specific soil layers were averaged. The "average" results for the Layers C, D, and E are presented in Table 2-4.

TABLE 2-4
VOC CONCENTRATION IN SOIL LAYERS C, D, & E

Contaminated Soil Layer	Type and Average Concentration of the Major Volatile Compounds[1]	
Layer C, average concentration of VOCs in soil	134,134 µg/kg (134 ppm)	
(Samples at depths of 12 feet-20 feet)	Benzene	1.6%
	Ethylbenzene	12.3%
	Chlorobenzene	7.0%
	Toluene	26.2%
	Trichloroethylene	6.8%
	Xylene	22.0%
	2-Butanone	23.9%
Layer D & E, average concentration of VOCs in soil	42,512 µg/kg (43 ppm)	
(Samples at depths of 20 feet - 39 feet)	Toluene	7.6%
	Trichloroethylene	35.9%
	Methylene Chloride	26.2%
	4-Methyl-2 Pentanone	4.7%
	2-Butanone	6.0%

(1) The major compounds in Layer C are 94% of the total volatile organics in Layer C and the major compounds in Layers D and E are 80% of the total volatile organics present in Layers D and E.

Based on the above results, the total quantity of volatile compounds for each layer was determined as summarized below in Table 2-5.

TABLE 2-5
TOTAL VOCS IN SOIL LAYERS C AND D

Layer	Amount of Contaminated Soil (yd^3)	Amount of Volatile Compounds (lb)
Layer C	45,000	16,181
Layers D and E	72,000	8,206

INTERNATIONAL
TECHNOLOGY
CORPORATION

July 28, 1992

Ms. Janet Rosati
Remedial Project Manager
Superfund Program
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105-3901

Subject: Comments on Soil Remediation Alternatives for the Purity Oil Site

Dear Ms. Rosati:

First of all, I want to thank you for providing me a copy of the Updated Capital and Operation & Maintenance Cost Estimates for the Purity Oil Site.

Secondly, I would like to provide you with a brief explanation of my background. Since the date that I joined IT in 1986, I have been working exclusively in the field of thermal remediation. In my current position as Director of Project Development, Remediation Projects, I am responsible for keeping abreast of all activities in the thermal remediation field. I routinely assist engineering firms (CH2M Hill, Dames & Moore, Bechtel, etc.) and commercial clients generate FS-level and RD-level cost estimates for their thermal remediation projects, and am actively involved in the detailed estimates that IT prepares for major lump sum project work that we bid on (e.g. Bayou Bonfouca, Times Beach, Baird & McGuire, etc.).

I also maintain a rather extensive database that summarizes all of the prices bid on thermal remediation projects since 1987. This database encompasses all bidding firms, not just IT.

Thirdly, I would like to provide you with some initial comments on the cost estimate prepared by ICF Technology for the Purity Oil Site.

I find it highly unusual that the analysis considers purchasing an incinerator to complete this work. On other thermal remediation projects performed and evaluated over the past 5-7 years, the incineration contractor provides a service that includes the cost of utilizing their incinerator to perform the work. To date, the industry participants (IT, Chem Waste Management, Roy F. Weston, Thermocor, OH Materials, etc.) have built at least 12 machines. These machines are typically depreciated over several projects so that one job is not burdened with the total cost of the equipment. This is a multi-million dollar savings to each project.

Based on the volumes being considered for incineration (55,000 tons for Alternative S-3 and 154,000 tons for Alternative S-5), it is highly unlikely that an 8-ton per hour (tph) machine would ever be proposed for this site. It is far more likely that a machine capable of incinerating 20-25 tph would proposed, since this is the typical size being utilized in the industry today. In fact, depending on equipment availability and the actual quantity to be incinerated, a 30-50 tph machine may even be proposed. This dramatic

difference in throughput capacity would have a very significant impact on the overall cost to execute this project.

The profile of the waste and the ash quality objectives could also have a significant impact on the overall cost. Based on our conversation a couple of weeks ago, it sounds like the waste does not have a high Btu content, nor is it very wet. Because the waste contains PCBs, a "high temperature" unit will be required, instead of the "dirt burners" that treat hydrocarbon-contaminated materials at low temperatures and very low prices ($60-100 per ton).

Assuming that the ash quality requirements will be comparable to other projects (e.g. 2 ppm PCBs), I would expect the total project price per ton to be equivalent to other on-site incineration projects bid during the past few years.

The industry's most recent award went to OH Materials for the Baird & McGuire site in Massachusetts. This project was very complex, in that it involved a myriad of on-site activities to safely treat dioxin- and arsenic-contaminated soil. Site dewatering was very difficult, and repetitive stack sampling was required throughout the project. That project, involving 200,000 tons of soil, was awarded for $57.9 million, or $289 per ton.

The Old Midland project, another dioxin project, was awarded to Chem Waste Management for $13.8 million. Based on an estimated soil quantity of 48,105 tons, the project was awarded at $288 per ton.

The Times Beach dioxin project, involving hopper-to-hopper incineration of 130,000 tons, is about to be awarded by Ebasco and Syntex for a price well under $40 million. This will equate to a unit rate of under $300 per ton.

At the LaSalle PCB project in Illinois, Thermocor was contracted to excavate and incinerate 72,000 tons of soil at a price of $17.25 million, or $240 per ton.

At Savanna Depot and the Alabama Army Ammunition Plant, Weston was selected to process explosives-contaminated soil at prices of $327 and $241 per ton, respectively.

At the Sikes Disposal Pits site, IT's contract was valued at $89.9 million to treat 341,000 tons of soil. This equates to a unit rate of $263 per ton.

Please note that most of these prices include the entire range of scope required to execute the project, including site preparation, mobilization, trial burn, waste excavation, incinerator operation, analytical, ash backfill, support services, project management, demobilization, and site restoration.

It is difficult to point out specific discrepancies in the cost analysis performed by ICF Technology for this site because of the approach utilized to prepare the numbers. However, I think it is safe to say that the current cost (1992 dollars) to execute Alternative S-5 would be no higher than $300 per ton, or $46 million. Obviously, this cost compares much more favorably to the $36.2 million estimated to contain the waste than ICF's estimates.

It is difficult to debate the political issues relating to utilizing on-site incineration at the Purity Oil site. Perhaps it would be impossible to receive public acceptance for this approach. However, I feel that it is imperative that the decision process be based on cost estimates that reflect current market conditions for each technology being considered. 14

If I can answer any questions related to the data contained in this letter, please feel free to call me at anytime. Thank you again for the opportunity to address this issue.

Sincerely yours,

Kevin R. Smith
Director of Project Development
Remediation Projects

Attachment B

TRANSCRIPT OF PUBLIC HEARING

PURITY OIL SALES --

SUPERFUND SITE

COMMUNITY MEETING

-0o0-

JUNE 22, 1992

7:00 P.M.

-0o0-

MALAGA COMMUNITY CENTER

3592 SOUTH WINERY

FRESNO, CALIFORNIA

REPORTED BY: DEBORAH E. SCHNEIDER
RPR, CSR NO. 7650

MR. CALERO: I would like to get started. Please take your seats.

Good evening. My name is Norman Calero, and I am the Community Relations Coordinator. I'd like to welcome you to the Environmental Protection Agency Public Meeting to discuss Purity Oil Sales in the Fresno area.

We had expected a greater turnout this evening. I want to ask up front how many people are community people, or how many people are here from out of the area. Are there any?

Well, with that in mind, we will be altering our presentation a little bit. I just wanted to ask you what kind of information you are seeking.

I guess, basically knowing most of you, you represent somebody who is linked to the site as a potentially responsible party. Our question, I guess, do you want a set presentation on a lot of information that you already know?

It's information already contained in the proposed plan and the fesibility studies we've done, and we can go straight to the questions and answers.

This is a formal comment period and this

meeting is being recorded. It is your chance to go on the record with questions, and also your chance to go on the record with comments in-- general.

So, we do need to go through those two portions of the question and answers and the normal comment part of the meeting up front.

We are open to whatever you guys feel you would like us to do. If you don't want us going through the entire presentation, we can go straight to and talk about the alternatives in detail.

Is there anybody out there who is not representing a potentially responsible party?

AUDIENCE MEMBER: I'm a student at Fresno State.

MR. CALERO: You are truly our community member tonight. We can go either way.

Janet has put a lot into her presentation, and we can walk through that, or if you want to go into questions and answers, we can do that.

It's up to the group. It's more your meeting than our meeting.

How many people want Janet to go through her presentation?

AUDIENCE MEMBER: How long is your presentation?

MS. ROSATI: About a half hour at the most.

MR. CALERO: Is Janet to make a presentation? May I see a show of hands. It's unanimous.

MS. ROSATI: Can everybody hear me if I don't use the mike. Some of you are already familiar with this, so I will go through it quickly.

The site is about a half mile south of Fresno City limits in the township of Malaga

It's a former waste oil recycling facility operated from 1935 to 1975, and it's located in an industrial area, and the land around it is predominantly industrially used. There are some adjacent residential land uses.

Tall Tree Mobile Home Park to the north and single family residences to the south. The dark dots that you see on the site were tanks that have since been removed by EPA.

I'll talk more about that in a minute. To give you a little idea of what we've done so far, the site was finalized on the National Priorities List in 1982. That's the list of

sites that are eligible for cleanup under the Superfund.

Initially, the State Department of Toxic Substances Control was lead agency and issued a Remedial Investigation Report in 1986.

EPA then assumed the lead for the site, and did supplemental soil and groundwater investigations, and we issued our own remedial investigation report in October of 1988.

We then issued a feasibility study report in April of 1989, and then we issued a proposed plan for groundwater and soil in April of 1989.

And the preferred remedy for groundwater in the proposed plan involved pumping and treating contamination above ground and then disposing of it.

For soil, the preferred alternative was to use either solvent extraction or some type of thermal treatment for soil from 0 to 14 feet. The exact treatment method would be chosen pending the results of additional soil testing.

They then split the two aspects of the site, soil and groundwater, and went on and issued a Record of Decisions for groundwater and tanks in December 19, 1989.

The feasibility study recognized that soil solidification was available to treat site waste, but didn't do an indepth analysis of it, so we did an analysis of soil solidification.

We tested four different specific treatment technologies on the site waste, and also revised one of the alternatives in the feasibility study involving soil vapor extraction, and tonight we are proposing a slightly different remedy for soil from that which was discussed in April of 1989.

The 1989 proposed plan involves treatment for soil from 0 to 14 feet, and the proposed plans before you now does not involve treatment from 0 to 14 feet.

Okay. Before I get into the discussion of soils, I want to go back a little bit and talk about groundwater.

The flow is to the northwest towards the City of Fresno. The water table presently is about 57 feet, and the groundwater is flowing at a moderate rate of flow of about 50 feet a year.

We have done a pretty extensive investigation of groundwater. The investigations indicate that the groundwater is contaminated with volatile organic compounds

(VOCs), semi-volatile organic compounds, iron and manganese.

Nine VOC's including trichloroethylene, 1,2-dichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, benzene, vinyl chloride, carbon tetrachloride, Cis-1, 2-DCE, Trans-1, 2-DCE exceed federal and state drinking water standards. Iron and manganese exceed federal standards.

The contaminated groundwater plume extends approximately 2,800 feet northwest of the site and is 800 feet wide and over 100 feet deep.

No municipal water supplies have been affected by contaminants from the site; however, contaminant levels in private wells at 11 properties exceed federal and state drinking water standards.

In March 1992, EPA connected the 11 properties to the City of Fresno or the Malaga County Water District water systems.

There are three components to the groundwater Record of Decision. One was tank removal, one was a water supply system, and one was pumping contaminated groundwater.

We removed the tanks, as I mentioned in

October of 1991. We connected the downgradient private well users to either the Malaga County Water District or City of Fresno water system, and that was completed in March of this year.

We have issued General Notice letters in April of 1990, and when a General Notice -- Well, you know what special notice letters are. We issued Special Notice on April 1st of 1991.

We were unable to reach an agreement for the groundwater operable unit and issued an Order, under Section 106, a Unilateral Administrative Order on September 30 of 1991.

The Order recipients are presently designing the groundwater pump and treat system, and the final design is due in the winter of 1993.

Soils now. Waste ponds covered a large portion of the site as you can see from the historical aerial photographs. About 4 acres were waste ponds actually from 0 to 14 feet deep.

In June of 1973, Purity Oil began complying with Superior Court order to empty and backfill the waste pits. Although the pits were filled by January of 1975, we have no evidence that they were emptied. Contaminated soil is

from the surface all the way down to about 47 feet. We have had some soil borings that were contaminated at that depth.

We have done a number of different -- taken a number of different soil samples, about 208 surface soil samples and a number of subsurface borings.

We have found organic and inorganic contamination. Among the contaminants found were Benzene which is a carcinogen, and lead which is highly toxic.

The levals range from less then 10 to 100,000 parts per million. Soil from 0 to 14 feet is more contaminated than soil from 14 feet down to the water table.

The waste is also highly acidic. We've been able to identify about five different layers of contamination.

This is the location of the warehouse and office, and this is the location of the former waste pits.

The oldest portion of the site from the photo of 1950 is here, and this is the area of deepest contamination.

Now, I'm going to go through all of the 8 alternatives that are listed in the proposed

plan.

Alternative #1 is No Action. This is an alternative that is required by law, and it's used as a baseline for developing the risk assessment.

In other words, if we don't do anything at this site, we allow unrestricted access to contaminated soil, this is what the risk will be.

Alternative #2 is the RCRA Equivalent Cap. The proposal is to cover the site with a multi-layer RCRA equivalent cap.

RCRA is the Resource Conservation Recovery Act. Under that act, the statute has guidelines that describe what the RCRA cap should be composed of, what the layers should be, how thick they should be.

Alternative #3 is our preferred alternative. This involves treating soils from 14 to 40 feet with Soil Vapor Extraction. As I mentioned, Soil Vapor Extraction is a common component to the rest of the alternatives you will hear about.

I'm going to show you in a few minutes what Soil Vapor Extraction looks like and describe how it would work.

We would excavate a trench all the way around the site and fill the trench with bentonite, which is a clay material and soil to form a slurry wall.

This wall would act as a barrier surrounding and isolating waste in upper layers of soil. The slurry wall would extend down 25 feet. We would get layers A and B and part of C.

We would cover the site with the RCRA cap and then put a retaining wall around the cap and enclose the North Central Canal.

Alternative #4 involves incineration of the upper 14 feet of soil. We would have to stabilize or solidify the incineration ash in order to put it back in the ground because of the lead that would be in the ash and treat the soil again from 14 to 40 feet with Soil Vapor Extraction at this point.

We won't need a RCRA cap because much of the waste would be treated. We would simply put a soil and clay cap on and cover over the site.

Alternative #5, #6 and #7 all deal with the same kind of treatment which is called solidification.

Basically, what solidification is, is

the mixing of contaminated soil with a substance that turns it into cement. It becomes very immobile and very stable.

The difference between #5, #6 and #7 -- The only difference is the amount of soil that we would stabilize or solidify.

For Alternative #5, we would propose solidifying the upper 10 feet of waste or soil, and then again, Soil Vapor Extraction for the lower layers and covering the site with a soil and clay cap.

Alternative #7, we would solidify all areas of soil where the lead concentration was 500 parts per million or greater, and then Soil Vapor Extraction for the lower layers and then capping.

Alternative #8, we take it somewhere else, excavate the upper 14 feet, haul it off site and treat it at an off-site permitted hazardous waste treatment and disposal facility, and then treat soils from 14 to 40 feet with Soil Vapor Extraction and cover the site with a soil and clay cap.

This overhead gives you an idea -- comparative idea of the costs for all of the alternatives and how long it would take before

we were able to say the site was clean.

The preferred alternative, as I mentioned, is Alternative #3, and it has a total cost of 36 million dollars, and it would take 9 years and 4 months approximately to complete it.

It sounds like a long time, but what's involved there is the operation of the Soil Vapor Extraction system. The remedy would be constructed in a much shorter period of time.

It would take 80 months for the Soil Vapor Extraction to work. The least expensive alternative is capping the site only, and that's about 24 1/2 million dollars. The most expensive would be the incineration -- on-site incineration for the upper 14 feet.

Now, as I mentioned, I would show you a diagram of how Soil Vapor Extraction works.

What we are proposing is to treat soil, as I mentioned, from 14 to 40 feet down to the water table with Soil Vapor Extraction. What you see here is a schematic drawing simply showing contaminated layers of soil.

The action of the Soil Vapor Extraction system would draw volatile organic compounds to the well.

They would be extracted, treated above

ground, and by the time they would be released into the atmosphere, they would be able to meet air quality standards.

We would surround the upper 25 feet of waste with a slurry wall and put a RCRA cap on top of that.

We tried to draw to scale to see how high the cap would be. And the cap, as I mentioned, is composed of different layers.

And this gives you an idea of what the layers are. From top to bottom, the top layer could be vegetation and then top soil. There's a layer for water drainage.

When it rains, rain water would permeate through upper layers and would be caught in a drainage system and be carried off site for disposal.

Rain water shouldn't ever permeate through the cap into the contaminated soil. There's an impermeable membrane, and there's also a gas collection layer where gases that might build up under the cap from waste that was left in place that would be vented and treated and released into the atmosphere.

One thing that I wanted to mention-- I am going to go back to this slide. We've

estimated that even though we are not proposing to actually treat Layers A and B, which is the top 14 feet of soil, about 25 percent of the volatile organic compounds in Layers A and B, we think they will be drawn down into lower layers by the action of Soil Vapor Extraction and will be treated, so there will be some treatment of waste in the upper two layers.

Now, where do we go from here. We are just about in the middle of comment period on our proposed plan. The comment period began June 8th, and it ends on July 10.

Any comments you have on any of the alternatives that you have heard about tonight and read about in the proposed plan, you can submit to us by July 10.

We will then respond to those comments in a responsive summary and issue a Record of Decision for soil in September of this year.

The Record of Decision will be our final decision on how we are going to treat the contaminated soil.

And then in the fall of this year, we will begin enforcement activities and special notice for design of the soils cleanup remedy.

That conlcudes my presentation. Norman.

MR. CALERO: I would like to open it up for questions and answers if anyone has any questions. Yes, sir?

AUDIENCE MEMBER: How wide is the slurry wall?

MS. ROSATI: It's going to be about two feet wide -- two feet.

MR. CALERO: Any other questions?

AUDIENCE MEMBER: I saw the site for the first time. Is it going to be cleaned up as part of the millions you are going to spend? Is it going to be cleaned up? I don't expect landscaping, but at least nicely cleaned up and no trash on it?

MS. ROSATI: Yeah, it will look a lot better than it looks right now. A RCRA cap, like I mentioned, you can put vegetation on top of the cap. That's not the way it is going to look like it does now. It is going to look a lot better than it does now.

AUDIENCE MEMBER: What is the square area that's going to be removed?

MS. ROSATI: The site is about 6.8 acres, and we are proposing to cap the whole thing.

AUDIENCE MEMBER: How about the

contamination; how far is it out past the property line?

MS. ROSATI: The ground water is -- contaminated 2,800 feet to North Avenue, if you are familiar with the area. 2,800 feet, and the soil, as I mentioned, is contaminated beneath the site all the way down to the water table.

AUDIENCE MEMBER: What is the depth of that?

MS. ROSATI: We have samples taken at 46 feet which we did when we did the remedial investigation. The water table is now about 57 feet.

AUDIENCE MEMBER: Does the contamination fall into the water table now?

MS. ROSATI: Yes.

AUDIENCE MEMBER: Is that drinking water?

MS. ROSATI: It's not being used for drinking water.

AUDIENCE MEMBER: An excellent presentation. I was wondering if I'm asking the right person. Have you done a risk assessment for the various alternatives?

MS. ROSATI: We did a baseline risk assessment.

AUDIENCE MEMBER: What was the baseline?

MS. ROSATI: For soil, the surface soil exceeds the hazardous index for lead, but for all layers of soil, it's within the acceptable range of ten to the minus four to ten to the minus six.

Let me add to that a little bit. What we also did in 1987 and 1988 -- I think it was in 1987, at that point in time, there was a reference dose for lead.

It's a level at which if you are exposed to a chemical, there will be some sort of health impact. A lot of you are aware of what is going on about lead. There is a health risk from the site due to lead exposure.

AUDIENCE MEMBER: Don't eat the dirt?

MS. ROSATI: Don't breathe dust.

AUDIENCE MEMBER: Can you give us a percentage on the toxic material compared to the impact of soil?

MS. ROSATI: I am not sure I follow you. Your question again?

AUDIENCE MEMBER: Sixty percent toxic or 40 for impacted, or is it all a 100 percent toxic waste area.

MS. ROSATI: It's kind of hard to answer

that, like for lead for example. EPA recommends cleaning up the soil so that the concentration of lead in the soil is 500 to 1,000 parts per million.

The volatile organic components which are in the soil are making their way filtering down through the soil and getting into the groundwater, so that as far as 2,800 feet off site, 11 of those compounds are exceeding drinking water standards.

In other words, the contamination that is in the soil is moving down into the groundwater, and the water is not safe to drink.

We've connected those property users to a water system.

MR. CALERO: If you don't have any other questions, we can start the formal comment period. Your comments will be made into a responsive summary, and your comments will be taken as part of the official record.

If you have any comments, please walk up to the microphone and state your name and comments.

Nobody?

Well, I'd like to thank you for comming to tonight's public meeting. We will be around

for awhile if anyone wants to stop and talk.

(WHEREUPON, THE PUBLIC HEARING WAS CONCLUDED AT THE HOUR OF 7:45 P.M.)

STATE OF CALIFORNIA)
) ss.
COUNTY OF FRESNO)

CERTIFICATION

I hereby certify that the foregoing is a full, true and correct transcript of the public hearing taken by me in shorthand on the date and in the matter described on the first page hereof.

DEBORAH E. SCHNEIDER
Certified Shorthand Reporter

Dated: August 5, 1992